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1991



US Department
of Transportation

National Highway
Traffic Safety
Administration



DOT HS 807 758
Final Report

June 1991

Evaluation of the Biosid Dummy MDB-to-Car Left Side Impact Test of a 27° Crabbed Moving Deformable Barrier into a Calspan RSV 5-Door Hatchback at 38.9 MPH

The United States Government does not endorse products or manufactures. Trade or manufacturer's names appear only because they are considered essential to the object of this report.

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SECTION 1.0

PURPOSE AND TEST SUMMARY

PURPOSE

The purpose of this test was to evaluate the response of side impact dummies in a moving deformable barrier into stationary vehicle left side impact test at an impact velocity in excess of the FMVSS 214 specifications. The vehicle was tested using conditions specified in FMVSS 214, Docket No. 88-06, Notice 8 final rule with the exception of the higher impact velocity.

INTRODUCTION

A stationary Calspan RSV 5-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on June 4, 1991. The test was to simulate an intersection collision with the striking vehicle travelling at 35 mph and the struck vehicle travelling at 17.5 mph. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. The leading edge of contact was to be 37 inches forward of the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Calspan RSV at 39.1 mph with the MDB's wheels crabbed clockwise to 27°. The actual test speed was 38.9 mph and the actual leading edge of contact was 36.1 inches forward of the midpoint of the Calspan RSV's wheelbase.

One (1) BIOSID dummy was located in the Calspan RSV driver's designated seating position and one (1) Part 572 F dummy was located in the left rear designated seating position.

Section 2.0 contains General Test and Vehicle Parameter Data. Section 3.0 contains dummy, vehicle, and moving deformable barrier data. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Data Plots. Appendix C contains Miscellaneous Information.

SECTION 2.0

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST RESULTS SUMMARY

This moving barrier side impact test was conducted at TRC on June 4, 1991.

The test vehicle, a Calspan RSV 5-door hatchback, was equipped with a 4 cylinder, transverse engine, and manual transmission. The vehicle's test weight was 3273 pounds. The vehicle's maximum crush was 7.5 inches.

The moving deformable barrier's speed was 38.9 mph at impact. The moving barrier's test weight was 3004 pounds.

The driver's Head Injury Criteria (HIC) was 748. The driver's Thoracic Trauma Index (TTI(d)) was 55.

The left rear passenger's HIC was 808. The left rear passenger's Thoracic Trauma Index (TTI(d)) was 80.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Calspan

MAKE/MODEL: RSV

VIN: NHTSA 8CRSV 006

BODY STYLE: 5-door hatchback

MODEL YEAR: NA

COLOR: Silver

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: NA

TRANSMISSION DATA: 5 SPEED, X MANUAL, AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 05/24/91

ODOMETER READING: 225.0

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TLITING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	Yes
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	None		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? No
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? Yes, small dents on the hood
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL: *

VEHICLE MANUFACTURED BY:

DATE OF MANUFACTURE: VIN:

GVWR: LBS

GAWR: FRONT: LBS., REAR: LBS.

*The vehicle did not contain a label stating certification data.

TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Atlas Roadhawk P185/70SR13

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): None

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 66.6 INCHES

WHEELBASE: 106.0 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA: *

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL: *

RECOMMENDED TIRE SIZE:

RECOMMENDED COLD TIRE PRESSURE: FRONT: PSI; REAR: PSI

DESIGNATED SEATING CAPACITY: ____FRONT ____REAR ____TOTAL .

VEHICLE CAPACITY WEIGHT: ____ LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 25.4; RF 24.8; LR 24.9; RR 24.2

PRE-TEST ATTITUDE: LF 24.5; RF 24.8; LR 22.5; RR 22.8

POST-TEST ATTITUDE: LF 25.4; RF 23.4; LR 23.5; RR 21.6

*The vehicle did not contain a label stating tire and capacity data.

TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	842 LBS.	RIGHT REAR 556 LBS.
LEFT FRONT	849 LBS.	LEFT REAR 552 LBS.
TOTAL FRONT WEIGHT	1691 LBS.	(60.4% OF TOTAL VEHICLE WEIGHT)
TOTAL REAR WEIGHT	1108 LBS.	(39.6% OF TOTAL VEHICLE WEIGHT)
TOTAL DELIVERED WEIGHT 2799 LBS.		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2799 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA)

DSC = DESIGNATED SEATING CAPACITY (NA)

RCLW* = 120 LBS.

TARGET TEST WEIGHT = UDW + RCLW* + (NO. OF SIDE IMPACT DUMMIES X 174 LBS/DUMMY)

TARGET TEST WEIGHT = 2799 + 120 + 348

TARGET TEST WEIGHT = 3267 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 126 LBS. OF CARGO WEIGHT:

RIGHT FRONT	823 LBS.	RIGHT REAR 732 LBS.
LEFT FRONT	949 LBS.	LEFT REAR 769 LBS.
TOTAL FRONT WEIGHT	1772 LBS.	(54.1% OF TOTAL VEHICLE WEIGHT)
TOTAL REAR WEIGHT	1501 LBS.	(45.9% OF TOTAL VEHICLE WEIGHT)
TOTAL TEST WEIGHT	3273 LBS.	(0.2% OVER TARGET TEST WEIGHT)

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 48.6 INCHES REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

POST-IMPACT DATA

TEST NUMBER: 910604

TEST DATE: 06/04/91

TEST TIME: 1406

TEST TYPE: Left side impact

IMPACT ANGLE: 270°

AMBIENT TEMPERATURE AT IMPACT AREA:

71° F

TEMPERATURE IN OCCUPANT COMPARTMENT:

76° F

IMPACT VELOCITY: PRIMARY = 38.9 MPH

SECONDARY = 39.0 MPH

(SPECIFIED RANGE = 38.6 to 39.6 MPH)

DISTANCE FROM BARRIER TO VEHICLE: ENTERING VELOCITY TRAP = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

TEST CONDITIONS

TEST NUMBER: 910604

DATE OF TEST: 06/04/91

TIME OF TEST: 1406

WIND VELOCITY: 4-7 mph @ 30° N

HUMIDITY: 60%

AMBIENT TEMPERATURE AT IMPACT AREA: 71° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 76° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
SUBJECT VEHICLE TEST WEIGHT (lbs.)	3273	3267
MDB TEST WEIGHT (lbs.)	3004	3000
MDB VELOCITY (mph)*	38.9	39.1
IMPACT POINT (in.)**::	36.1	37.0

DUMMIES

	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:		BIOSID		SID	
SERIAL NO.:		002		905	
INSTRUMENTATION:					
HEAD ACCEL.:		3		3	
UPPER SPINE ACCEL.:		4		3	
UPPER RIB ACCEL.:		2		2	
CENTER RIB ACCEL.:		2			
LOWER RIB ACCEL.:		2		2	
LOWER SPINE ACCEL.:		4		4	
UPPER ABDOMEN RIB ACCEL.:	1				
LOWER ABDOMEN RIB ACCEL.:	1				
ABDOMEN DISPLACEMENT:	2				
PELVIS ACCEL.:	3			3	
RIB DISPLACEMENT:	3			1	
SHOULDER ACCELS.:	1				
SHOULDER DISPLACEMENT:	1				

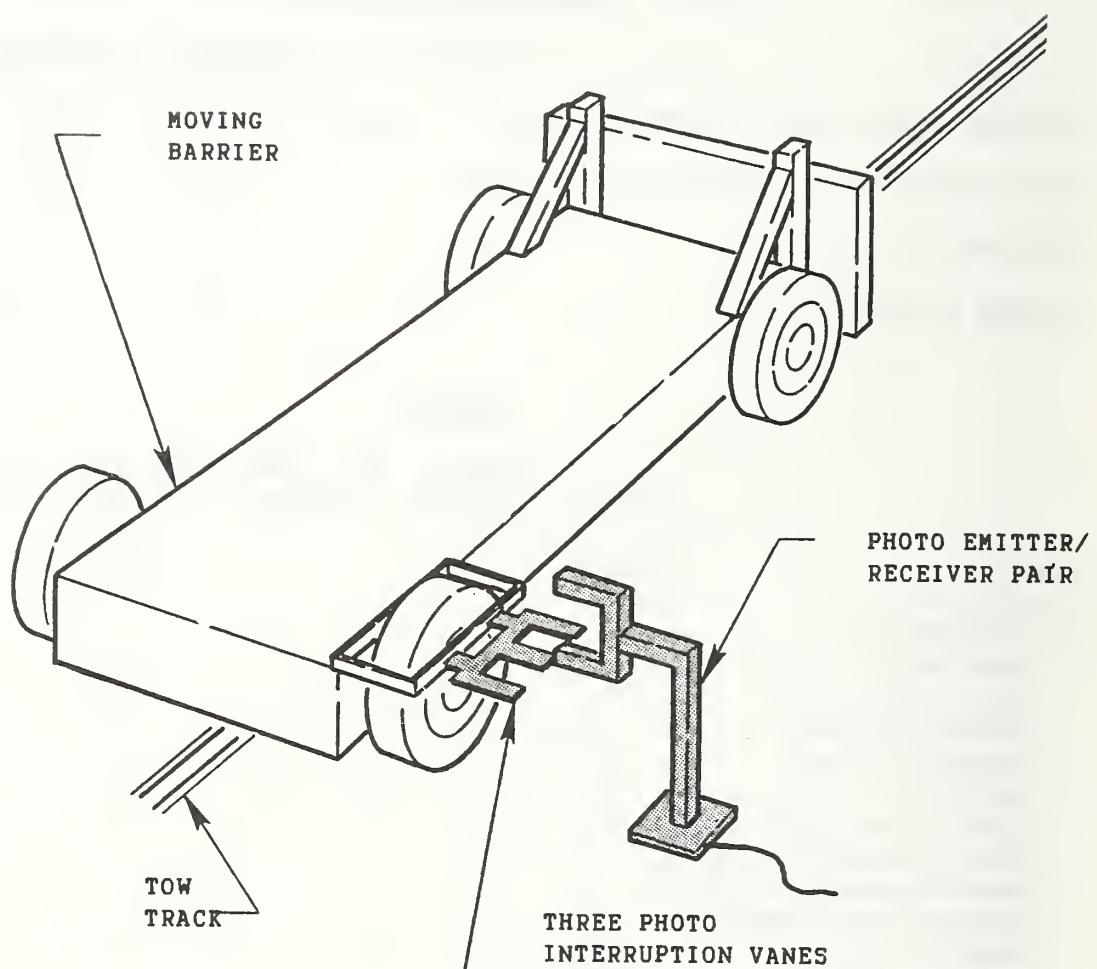
RESTRAINT SYSTEM: DRIVER'S AIRBAG
& LAP BELT THREE-POINT
UNIBELT

REMARKS:

*AS MEASURED OVER FINAL ONE FOOT OF TRAVEL.

**AS MEASURED FORWARD OF THE SUBJECT VEHICLE'S WHEELBASE MIDPOINT.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver two inches before impact.

The vanes have one foot spacing.

SECTION 3.0

DUMMY, VEHICLE, AND MOVING DEFORMABLE BARRIER DATA

DUMMY DATA SUMMARY

TEST NUMBER 910604

DRIVER DUMMY

SN: 002

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

HEAD

LONGITUDINAL	35.1	30.6	33.9	38.0
LATERAL	159.3	31.1	7.3	144.9
VERTICAL	25.9	33.9	38.3	38.1
RESULTANT	165.5	31.0		
HIC	748 FROM 28.6 TO 33.1			

LEFT SHOULDER

LATERAL	83.8	20.6	32.1	28.1
DELTA V (MPH)	30.9	59.0		
LATERAL DISPL.	1.5	39.6	0.1	57.4

UPPER SPINE

LONGITUDINAL	11.6	38.1	7.3	31.9
LATERAL (P)	51.6	36.3	7.1	88.1
DELTA V (MPH)	27.6	53.8		
LATERAL (R)	49.9	36.3	8.2	66.9
DELTA V (MPH)	27.2	53.2		
VERTICAL	3.2	26.3	6.2	33.1
RESULTANT (P)	52.1	36.9		
RESULTANT (R)	50.4	36.3		

LEFT UPPER THORAX RIB

LATERAL (P)	50.5	17.5	10.2	72.5
DELTA V (MPH)	27.4	68.1		
LATERAL (R)	51.6	17.5	10.3	71.9
DELTA V (MPH)	28.2	66.2		
LATERAL DISPL.	1.7	40.1	0.0	13.9

LEFT CENTER THORAX RIB

LATERAL (P)	51.9	16.3	17.8	34.4
DELTA V (MPH)	26.1	68.1		
LATERAL (R)	53.0	16.3	14.1	34.4
DELTA V (MPH)	27.6	68.1		
LATERAL DISPL.	2.3	39.5	0.0	14.0

LEFT LOWER THORAX RIB

LATERAL (P)	60.6	16.9	55.9	34.4
DELTA V (MPH)	26.3	65.6		
LATERAL (R)	63.6	16.9	48.7	34.4
DELTA V (MPH)	24.2	65.6		
LATERAL DISPL.	2.7	39.0	0.1	94.6

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 910604

DRIVER DUMMY

SN: 002

POSITIVE DIRECTION	NEGATIVE DIRECTION		
MAX	MSEC	MAX	MSEC

THORACIC TRAUMA INDEX

TTI (P)	55.0
TTI (R)	56.5

LOWER SPINE

LONGITUDINAL	16.0	31.9	11.4	50.6
LATERAL (P)	49.3	38.8	10.5	88.8
DELTA V (MPH)	22.4	53.9		
LATERAL (R)	49.4	38.8	10.8	89.4
DELTA V (MPH)	22.1	52.8		
VERTICAL	7.9	38.8	8.1	23.8
RESULTANT (P)	50.1	38.8		
RESULTANT (R)	50.2	38.1		

LEFT UPPER ABDOMEN

LATERAL	101.9	26.3	19.3	76.9
DELTA V (MPH)	28.5	72.9		
LATERAL DISPL.	1.1	40.8	0.0	284.1

LEFT LOWER ABDOMEN

LATERAL	99.5	24.4	26.7	30.0
DELTA V (MPH)	27.6	75.1		
LATERAL DISPL.	1.2	40.9	0.1	275.0

PELVIS

LONGITUDINAL	3.9	56.9	13.5	46.3
LATERAL	83.2	33.7	8.0	99.4
DELTA V (MPH)	21.2	56.4		
VERTICAL	6.8	52.5	20.7	33.7
RESULTANT	86.1	33.7		

POSITIVE DIRECTION

LONGITUDINAL:	FORWARD
LATERAL:	RIGHTWARD
VERTICAL:	UPWARD

NEGATIVE DIRECTION

LONGITUDINAL:	REARWARD
LATERAL:	LEFTWARD
VERTICAL:	DOWNWARD

NOTES:

For dummy channels Delta V is the velocity change at the approximate time of separation from the contact area.

(P) Primary Sensor

(R) Redundant Sensor

DUMMY DATA SUMMARY

TEST NUMBER 910604

PASSENGER DUMMY
SN: 905

	POSITIVE DIRECTION MAX	MSEC	NEGATIVE DIRECTION MAX	MSEC
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HEAD

LONGITUDINAL	8.9	50.3	16.9	39.1
LATERAL	122.3	38.8	9.4	224.1
VERTICAL	38.3	43.9	24.4	37.4
RESULTANT	124.4	38.8		
HIC		808	FROM 33.9 TO 43.2	

UPPER SPINE

LONGITUDINAL	4.3	203.1	21.5	40.0
LATERAL	105.3	43.8	30.3	66.9
DELTA V (MPH)	32.9	61.2		
VERTICAL	4.9	67.5	12.6	44.4
RESULTANT	106.7	43.8		

LEFT UPPER THORAX RIB

LATERAL (P)	82.5	28.7	11.5	71.3
DELTA V (MPH)	27.2	69.4		
LATERAL (R)	78.8	28.7	14.8	57.5
DELTA V (MPH)	23.8	68.4		

LEFT LOWER THORAX RIB

LATERAL (P)	78.4	28.7	27.1	58.1
DELTA V (MPH)	25.0	54.4		
LATERAL (R)	78.3	28.7	27.9	58.1
DELTA V (MPH)	25.9	54.4		

THORACIC TRAUMA INDEX

TTI (P)	79.9			
TTI (R)	76.9			

LOWER SPINE

LONGITUDINAL	9.7	46.9	22.4	35.0
LATERAL (P)	77.3	33.7	17.4	63.8
DELTA V (MPH)	29.4	59.4		
LATERAL (R)	75.0	33.7	17.2	63.8
DELTA V (MPH)	28.7	58.9		
VERTICAL	5.1	66.3	9.5	44.4
RESULTANT (P)	80.1	33.7		
RESULTANT (R)	77.8	33.7		

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 910604

PASSENGER DUMMY
SN: 905

POSITIVE DIRECTION	NEGATIVE DIRECTION		
MAX	MSEC	MAX	MSEC

CHEST DISPLACEMENT

LATERAL (in)	2.0	49.8	0.0	140.5
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PELVIS

LONGITUDINAL	4.2	160.6	17.7	41.9
LATERAL	78.2	37.5	5.7	138.1
DELTA V (MPH)	26.0	64.5		
VERTICAL	3.3	65.6	5.7	44.4
RESULTANT	79.1	37.5		

POSITIVE DIRECTION

LONGITUDINAL:	FORWARD
LATERAL:	RIGHTWARD
VERTICAL:	UPWARD

NEGATIVE DIRECTION

LONGITUDINAL:	REARWARD
LATERAL:	LEFTWARD
VERTICAL:	DOWNWARD

NOTES:

For dummy channels Delta V is the velocity change at the approximate time of separation from the contact area.

(P) Primary Sensor

(R) Redundant Sensor

POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #002	PASSENGER #905
HEAD	<u>B-pillar & headliner</u>	<u>C-pillar & headliner</u>
CHEST	<u>Inner door panel</u>	<u>Inner door panel</u>
ABDOMEN	<u>None</u>	<u>None</u>
LEFT KNEE	<u>Inner door panel</u>	<u>Inner door panel</u>
RIGHT KNEE	<u>None</u>	<u>None</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Tools required</u>	<u>Easy</u>
REAR	<u>Tools required</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>None</u>	<u>None</u>

GLAZING DAMAGE:

The left side door glass was shattered.

The left side of the windshield was cracked upon

impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy's head rotated to the left, impacting the side headliner and left B-pillar. The dummy's chest and the dummy's left leg contacted the left front inner door panel. The dummy was restrained by the driver's lap belt. The dummy's torso rotated forward and then toward the right. The dummy came to rest leaning to the right, restrained by the driver's lap belt.

LEFT REAR PASSENGER DUMMY

Upon impact, the left rear passenger dummy's head rotated toward the left impacting the side headliner and left C-pillar. The dummy's chest and the dummy's left leg impacted the left rear inner door panel. The dummy was restrained by the three-point unibelt. The dummy's torso then rotated toward the right. The dummy came to rest leaning to the right, restrained by the three-point unibelt.

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperatures inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained by shading the vehicle with tarps until approximately 1 minute prior to the test.

The following Side Impact Dummy Seating Procedure summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

SIDE IMPACT DUMMY SEATING PROCEDURE

1. SEAT POSITIONING

- A. Place seat at the longitudinal midpoint of fore to aft adjustment (forward most locking position to rear most locking position). If no locking position is available at mid-travel, use the position immediately rearward of mid-travel.
- B. If the seat back angle is adjustable, place it in the manufacturer's stated nominal design location. If not specified, set it at the first detent rearward of 25°.
- C. Adjustable head restraints are set so that the top surface of the restraint is level with the cg of the dummy's head.
- D. If the seat is equipped with adjustable side or lumbar supports, they are set in their "released" or full back positions.
- E. All other seat adjustments are positioned to their mid-travel locations. If locking positions are not available at these mid-points, use the position immediately rearward, down, left or clockwise of mid-travel. Clockwise is defined looking rear to front or left to right relative to the vehicle. This also applies to adjustable steering columns.

2. H-POINT DETERMINATION

- A. The SAE three-dimensional H-point machine (SAE J826 APR80 - 50th percentile male configuration) is used to locate the H-point for each surrogate.
- B. The H-point machine is positioned on the seat as follows:
 1. Bucket or Contoured Seats - The H-point machine is centered on the bucket or contour such that its midsagittal plane is vertical and longitudinal.

2. Bench Seats

- a. Driver position. The H-point machine is positioned such that its midsagittal plane is vertical, longitudinal, and contains the steering wheel center point.
- b. Outboard passenger positions. The H-point machine is positioned such that its midsagittal plane is vertical, longitudinal, and the same distance from the longitudinal vehicle centerline as that for the driver position.
- c. Center passenger positions. The H-point machine is positioned such that its midsagittal plane is vertical and contains the longitudinal vehicle centerline.

C. Locate the H-point position using the steps outlined in sections 4 through 6 of SAE Standard J826 APR80, unless otherwise specified in section 1 or 2 of this document. Record the coordinates of this point, relative to the vehicle, for use in sections 3 and 4 of this document.

3. BIOSID DUMMY POSITIONING PROCEDURE

A. DRIVER

1. The upper torso of the dummy shall rest against the seat back. The midsagittal plane of the test dummy shall be (1) vertical, (2) parallel to the vehicle's longitudinal centerline, and (3) pass through the center of the steering wheel rim (bench seat) or coinciding with the longitudinal centerline of the bucket seat (bucket seat).
2. The inner surface of the lower end of the arm shall be in contact with the upper torso jacket of the dummy. The longitudinal centerline of the arm should be parallel to the coronal plane (y-z plane of the torso).
3. The "H" point of the dummy shall be positioned within one-half (0.5) inch (12.5 mm) of the required "H" point location as determined using the SAE J826 manikin.

4. The pelvic angle should be between 21 and 25 degrees from the horizontal, sloping upward toward the front of the vehicle. Note: The BIOSID uses the same pelvic angle gage as the Hybrid III-50th.
5. The dummy's upper legs should be positioned symmetrical about the midsaggital plane with a spacing between the knees of 10.3 inches (262 mm) measured from the outboard surface of the knee castings. If practical, both legs of the dummy should be in the vertical and longitudinal planes and the knees should be level.
6. The right foot of the dummy should rest on the accelerator with the heel resting as far forward as possible on the floorpan. The left foot should be set perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel.

B. REAR PASSENGER

1. The upper torso of the dummy should rest against the seat back. The midsaggital plane of the dummy is vertical and parallel to the vehicle's longitudinal centerline, and, if possible, the same distance from the vehicle's longitudinal centerline as the midsaggital plane of the dummy in the driver position (bench seat) or coincides with the longitudinal centerline of the bucket seat (bucket seat). If this is not possible, then the dummy should be positioned so the outermost point of the skin of the upper torso just touches the innermost surface of the vehicle adjacent to the dummy.
2. The arm position shall be set in the same manner as with the driver.
3. The "H" point of the dummy shall be positioned within one-half (0.5) inch (12.5 mm) of the "H" point location as determined using the SAE J826 manikin.
4. The pelvic angle should be the same as that specified for the driver.
5. The upper legs should be set in the same manner as the driver.

4. POSITIONING PROCEDURE FOR THE PART 572 SUBPART F TEST DUMMY

A. Position a correctly configured test dummy, conforming to subpart F of Part 572, in the front outboard seating position on the side of the test vehicle to be struck by the moving deformable barrier and position another conforming test dummy in the rear outboard position on the same side of the vehicle. Each test dummy is restrained using all available belt systems in all seating positions where such belt restraints are provided. In addition, any folding armrest is retracted.

B. TORSO

1. FOR A TEST DUMMY IN THE DRIVER POSITION

a. For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and passes through the center of the steering wheel.

b. For a bucket seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket seat.

2. FOR A TEST DUMMY IN THE FRONT OUTBOARD PASSENGER POSITION

a. For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and the same distance from the vehicle's longitudinal centerline as would be the midsagittal plane of a test dummy positioned in the driver position under 4.B.1(a).

b. For a bucket seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket seat.

3. FOR A TEST DUMMY IN EITHER OF THE REAR OUTBOARD PASSENGER POSITIONS

a. For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and, if possible, the same distance from the vehicle's longitudinal centerline as the midsagittal plane of a test dummy positioned in the driver position under 4.B.1(a). If it is not possible to position the test dummy so that its midsagittal plane is parallel to the vehicle longitudinal centerline and is at this distance from the vehicle's longitudinal centerline, the test dummy is positioned so that some portion of the test dummy just touches, at or above the seat level, the side surface of the vehicle, such as the upper quarter panel, an armrest, or any interior trim (i.e., either the broad trim panel surface or a smaller, localized trim feature).

b. For a bucket or contoured seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket or contoured seat.

C. PELVIS

1. H-POINT

The H-points of each test dummy coincide within 1/2 inch in the vertical dimension and 1/2 inch in the horizontal dimension of a point 1/4 inch below the position of the H-point determined by using the equipment for the 50th percentile and procedures specified in SAE J826 (1980), except that Table 1 of SAE J826 is not applicable. The length of the lower leg and thigh segments of the H-point machine are adjusted to 16.3 and 15.8 inches, respectively.

2. PELVIC ANGLE

As determined using the pelvic angle gauge (GM drawing 78051-532 incorporated by reference in part 572, subpart E which is inserted into the H-point gauging hole of the dummy, the angle of the plane of the surface on the lumbar-pelvic adaptor on which the lumbar spine attaches is 23 to 25 degrees from the horizontal, sloping upward toward the front of the vehicle.

D. LEGS

1. FOR A TEST DUMMY IN THE DRIVER POSITION.

The upper legs of each test dummy rest against the seat cushion to the extent permitted by placement of the feet. The left knee of the dummy is positioned such that the distance from the outer surface of the knee pivot bolt to the dummy's midsaggital plane is six inches. To the extent practicable, the left leg of the test dummy is in a vertical longitudinal plane.

2. FOR A TEST DUMMY IN THE OUTBOARD PASSENGER POSITIONS

The upper legs of each test dummy rest against the seat cushion to the extent permitted by placement of the feet. The initial distance between the outboard knee clevis flange surfaces is 11.5 inches. To the extent practicable, both legs of the test dummies in outboard passenger positions are in vertical longitudinal planes. Final adjustment to accommodate placement of feet in accordance with Section E for various passenger compartment configurations is permitted.

E. FEET

1. FOR A TEST DUMMY IN THE DRIVER POSITION

The right foot of the test dummy rests on the undepressed accelerator with the heel resting as far forward as possible on the floorpan. The left foot is set perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel.

2. FOR A TEST DUMMY IN THE FRONT OUTBOARD PASSENGER POSITION

The feet of the test dummy are placed on the vehicle's toeboard with the heels resting on the floorpan as close as possible to the intersection of the toeboard and floopan. If the feet cannot be placed flat on the toeboard, they are set perpendicular to the lower legs and placed as far forward as possible so that the heels rest on the floorpan.

3. FOR A TEST DUMMY IN EITHER OF THE REAR OUTBOARD PASSENGER POSITIONS

The feet of the test dummy are placed flat on the floorpan and beneath the front seat as far as possible without front seat interference. If necessary, the distance between the knees can be changed in order to place the feet beneath the seat.

5. FINAL POSITIONING

- A. Prior to conducting the test, the dummy position is visually checked. The dummy is to be properly positioned laterally with its midsaggital plane vertical and longitudinal, and the upper torso resting against the seat back. The H-point and pelvis angle are to be within the specified ranges and the foot, knee, and leg placements are to be as outlined. The COTR is to be satisfied with the final dummy position and any deviations from this procedure are to be approved by the COTR.
- B. The final dummy position is recorded. These measurements are to include, but not be limited to, pelvis and head angles as well as actual H-point and head cg locations relative to the vehicle. The straight-line distance from the H-point to the center of the outer ankle bolt is also recorded for one of the legs (eg. left H-point to left angle bolt).

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Calspan/RSV

SEAT TYPE: Bench ADJUSTER TYPE: X Manual
 Bucket Power
 Split bench Non-adjustable

TECHNICIANS:

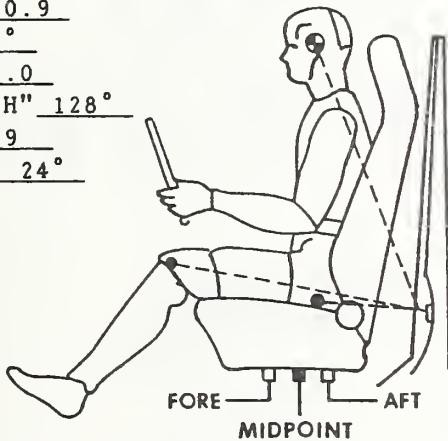
BUCKET SEAT BACK TYPE: X Non-adjustable
 Adjustable reclining

1. R. Branham
2. D. Carpenter
3. P. Cummins
4. _____

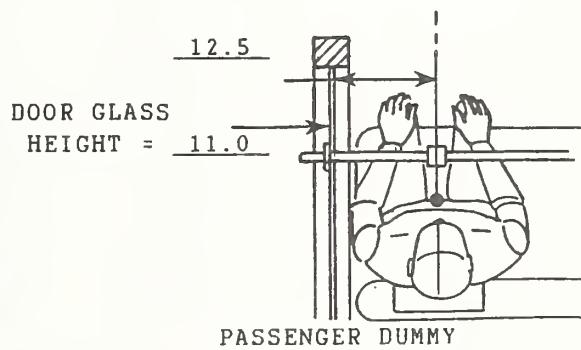
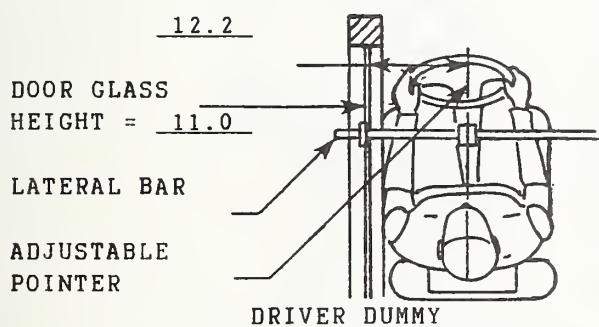
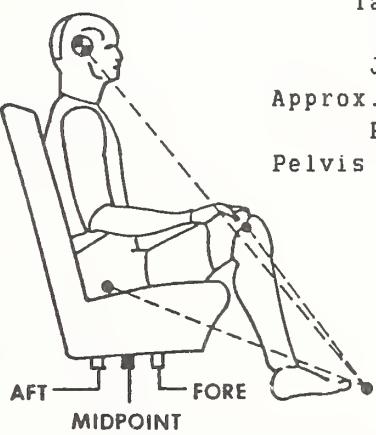
POSITIONING DATE: 06/04/91

AMBIENT TEMP.: 76° F TIME: 1100

DRIVER DUMMY* # 002 TYPE: BIOSID
 Head 4°
 Target 20.9
 Knee 93°
 Joint 25.0
 Approx. "H" 128°
 Point 9.9
 Pelvis 24°



BACK SEAT DRIVER
 SIDE DUMMY** # 905 TYPE: 572F
 Head -1°
 Target 18.0
 Knee 83°
 Joint 24.8
 Approx. "H" 122°
 Point 11.2
 Pelvis 25°

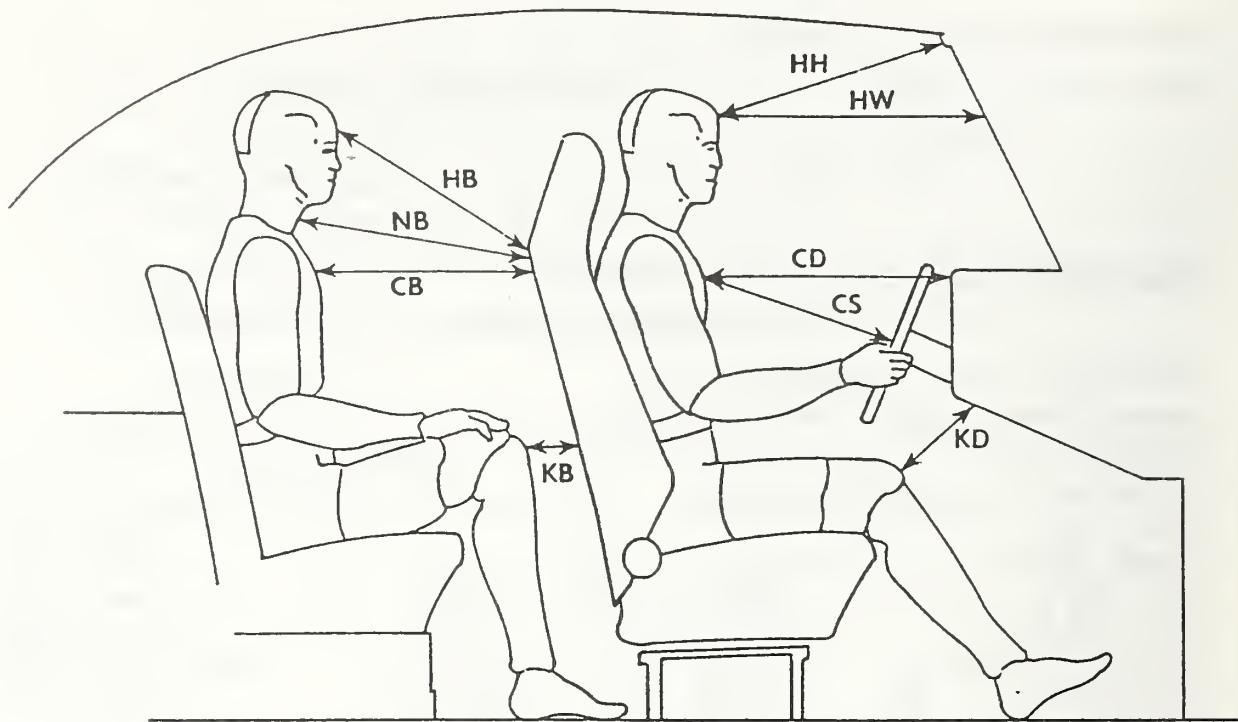


*Driver dummy measurements are referenced to top of striker bolt and all angles referenced to vertical.

**Passenger dummy measurements are referenced to top of rear door striker bolt with front seat in mid-position and all angles are referenced to vertical.

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

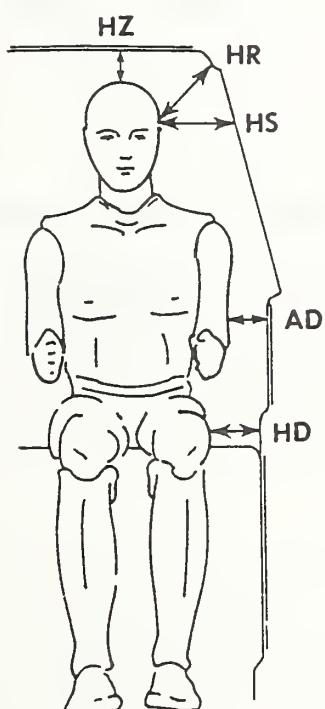
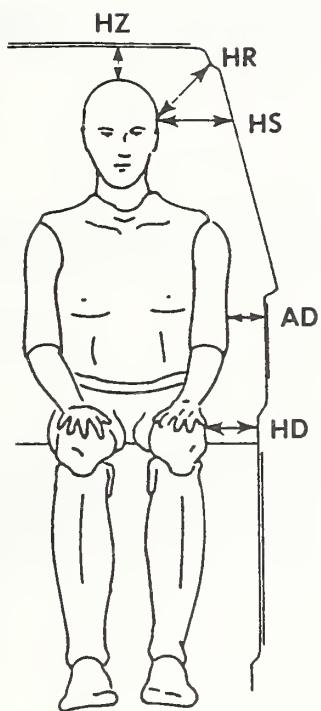


REAR DRIVER'S
DRIVER SIDE PASSENGER

HH	17.4	NA
HW	20.2	NA
CD	21.1	NA
CS	10.1	NA
KDL	2.4	NA
KDR	2.2	NA
HB	NA	25.0
NB	NA	21.8
CB	NA	17.1
KBL	NA	2.8
KBR	NA	3.2

ALL MEASUREMENTS ARE IN INCHES.

DUMMY LATERAL CLEARANCE DIMENSIONS



	DRIVER	REAR DRIVER'S SIDE PASSENGER
--	--------	---------------------------------

HR	4.9	4.4
HS	9.4	9.8
AD	1.8	2.8
HD	4.2	4.8
HZ	2.8	2.2

ALL DISTANCE MEASUREMENTS ARE IN
INCHES.

SAE 3D H-POINT MACHINE LOCATION AND DUMMY LOCATION DATA

	DRIVER #002	PASSENGER #905
SAE 3D H-POINT MACHINE LOCATION:	X = 12.0 Z = -7.0	X = 6.7 Z = -5.2
DUMMY H-POINT LOCATION:	X = 11.7 Z = -6.5	X = 6.7 Z = -5.5
DUMMY PELVIC ANGLE:	24°	25°

The driver's H-point location measurements are referenced to the left door center striker bolt and the passenger's H-point location measurements are referenced to the left rear door center striker bolt in two-dimensional rectangular coordinates:

+X = Forward
+Z = Upward

All dimensions are in inches except as noted.

Pelvis angles are referenced to horizontal, positive is upward toward the front of the vehicle.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910604

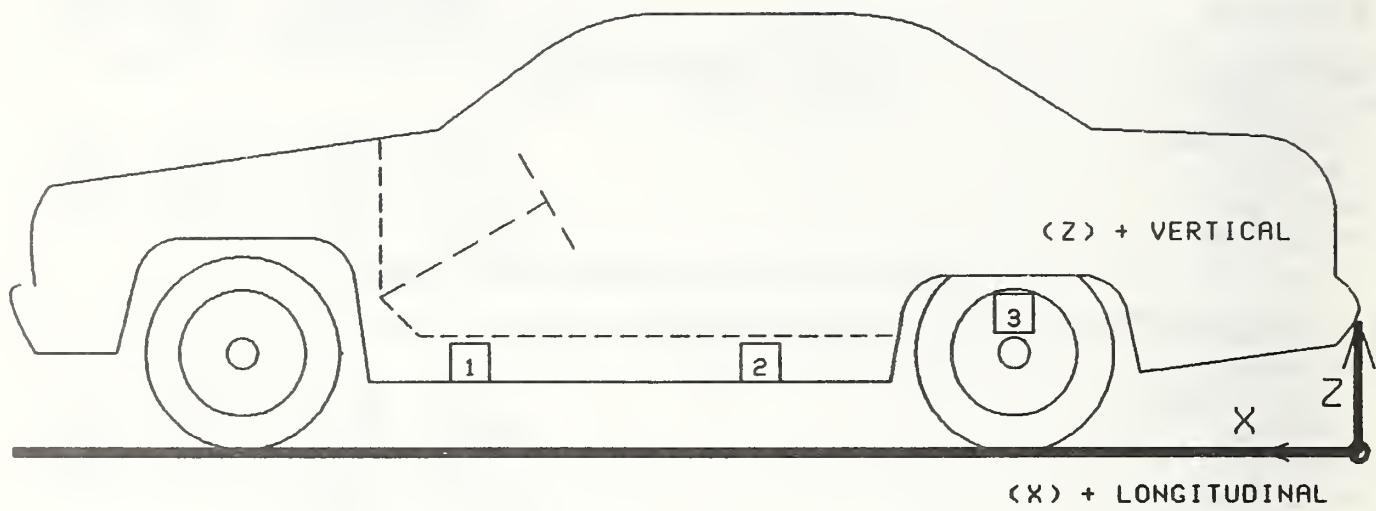
No.	LOCATION	X*	Y*	Z*	POSITIVE	NEGATIVE
					DIRECTION	DIRECTION
1	RIGHT SILL AT FRONT SEAT	104.2	25.1	10.8		
	LONGITUDINAL			4.8	58.9	6.7 14.5
	LATERAL			29.6	11.8	2.6 153.8
	VERTICAL			6.9	15.0	6.0 32.3
	RESULTANT			29.8	11.9	
	Delta VY is 15.1 MPH @ 74.4 MSEC					
2	RIGHT SILL AT REAR SEAT	70.2	24.8	11.5		
	LONGITUDINAL			5.9	59.3	7.3 14.3
	LATERAL			29.6	11.4	3.0 97.1
	VERTICAL			3.9	79.8	9.7 42.5
	RESULTANT			29.8	11.4	
	Delta VY is 19.2 MPH @ 71.2 MSEC					
3	REAR DECK OVER AXLE	31.8	5.9	18.8		
	LONGITUDINAL			2.6	58.0	7.3 21.4
	LATERAL			25.8	10.9	4.1 85.8
	VERTICAL			5.5	28.9	7.5 59.5
	RESULTANT			26.6	10.9	
	Delta VY is 24.6 MPH @ 65.2 MSEC					

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

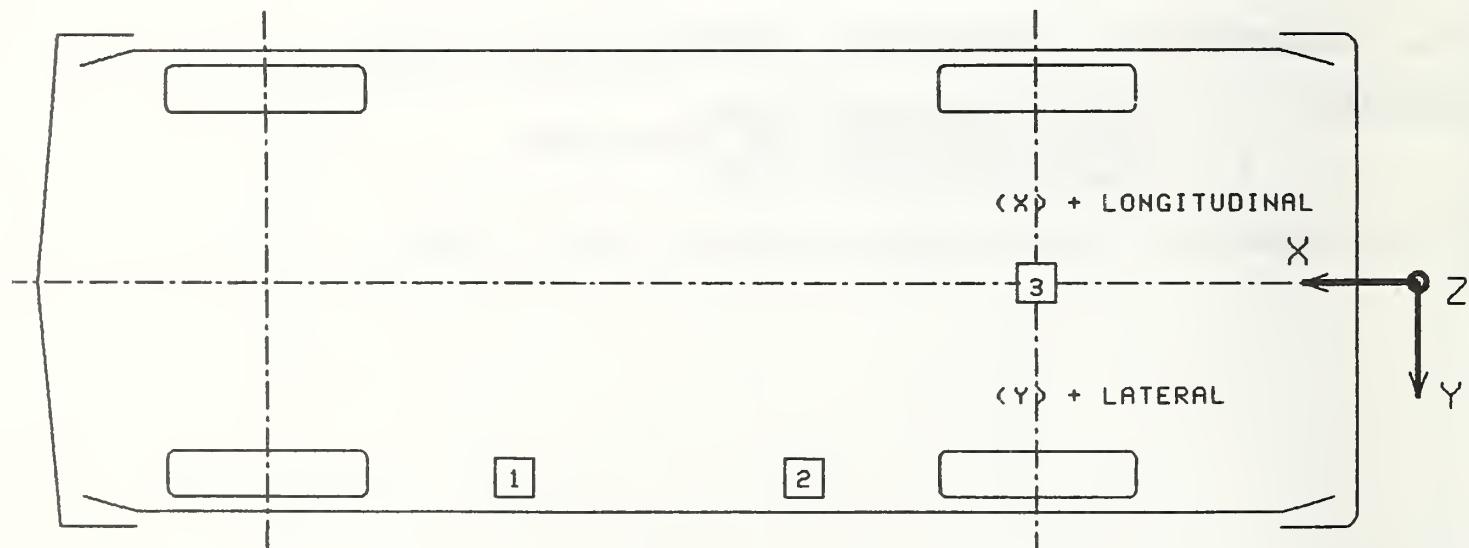
REFERENCE: X: + FORWARD FROM REAR BUMPER
 Y: + RIGHTWARD FROM VEHICLE CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

All measurements of accelerometer locations are in inches.

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

ZERO DISTANCE AT PROJECTED IMPACT POINT*

TOP WIDTH: 47.1; WHEELBASE: 106.0

WIDTH: 66.6; TRACK: 55.8; LENGTH: 178.0; OVERHANG: FRONT: 36.5; REAR: 37.8

LOCATION	HEIGHT(IN)	-6	0	6	12	18	24	30	36	42	48	54	60	66	72	78
----------	------------	----	---	---	----	----	----	----	----	----	----	----	----	----	----	----

PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Axle Height	10.8	X	17.6	17.9	17.8	17.8	17.8	17.9	18.0	18.2	18.2	18.8	X	X		
H-point	19.0	15.8	15.4	15.3	15.2	15.5	15.1	15.0	15.1	14.9	15.1	15.2	15.1	15.1	X	
Mid Door	23.2	15.9	15.6	15.4	15.4	15.2	15.3	15.2	15.3	15.2	15.1	15.0	15.4	15.1	15.5	15.3
Window Sill	34.4	18.5	18.3	17.9	17.9	17.8	17.6	17.5	17.8	17.6	17.4	17.4	17.6	17.5	17.5	17.5
Window Top	52.5	X	X	X	X	X	X	X	26.6	26.9	26.5	26.6	26.6	26.2	26.1	25.6

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Axle Height	10.8	X	18.2	19.4	19.4	19.4	19.6	20.0	20.5	20.8	21.9	20.9	20.1	19.6	X	X
H-point	19.0	18.0	17.4	18.4	20.2	21.5	21.9	22.1	21.6	20.8	21.1	21.2	21.5	20.6	18.2	X
Mid Door	23.2	18.8	18.1	18.2	20.0	21.8	21.8	22.0	22.8	21.1	21.5	22.0	22.2	21.2	19.2	17.2
Window Sill	34.4	19.0	19.2	20.0	20.3	20.6	21.3	22.0	22.5	23.2	24.2	24.2	24.0	23.4	22.0	21.0
Window Top	52.5	X	X	X	X	X	X	27.9	28.8	30.2	29.4	28.4	27.6	27.5	27.1	26.6

STATIC CRUSH (IN)

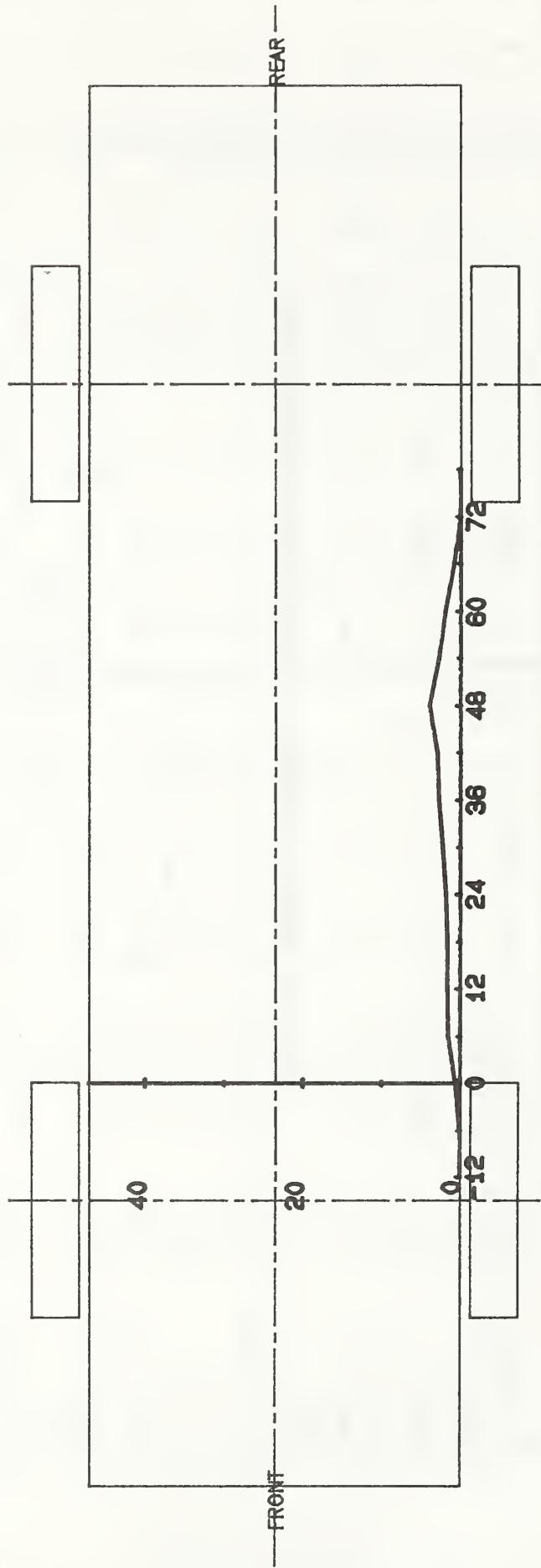
Axle Height	10.8	X	0.6	1.5	1.6	1.6	1.8	2.2	2.7	2.9	3.9	2.7	1.9	0.8	X	X
H-point	19.0	2.2	2.0	3.1	5.0	6.0	6.8	7.1	6.5	5.7	6.2	6.1	6.4	5.4	3.1	X
Mid Door	23.2	2.9	2.5	2.8	4.6	6.6	6.5	6.8	7.5	5.9	6.4	7.0	6.8	6.1	3.7	1.9
Window Sill	34.4	0.5	0.9	2.1	2.4	2.8	3.7	4.5	4.7	5.6	6.8	6.8	6.4	5.9	4.5	3.5
Window Top	52.5	X	X	X	X	X	X	1.3	1.9	3.6	2.9	1.8	1.0	1.3	1.0	1.0

*Projected impact point is 37 inches forward of driver's side wheelbase midpoint.

Column readings are front to rear from left to right.

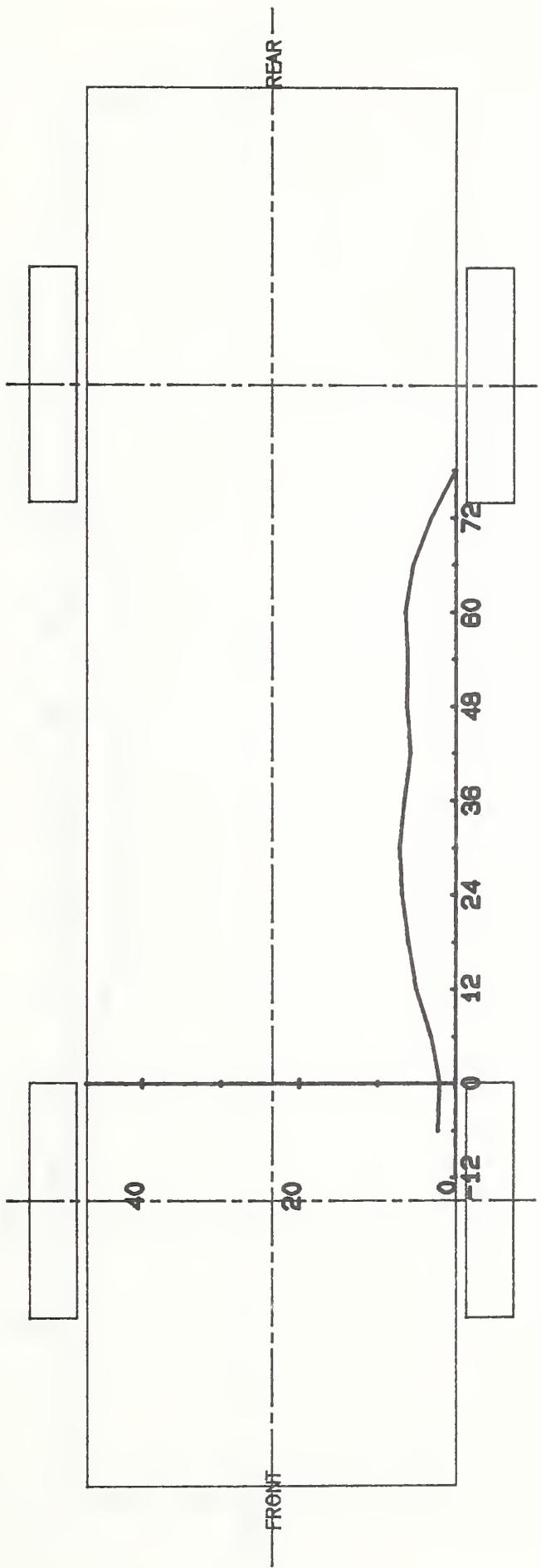
**Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



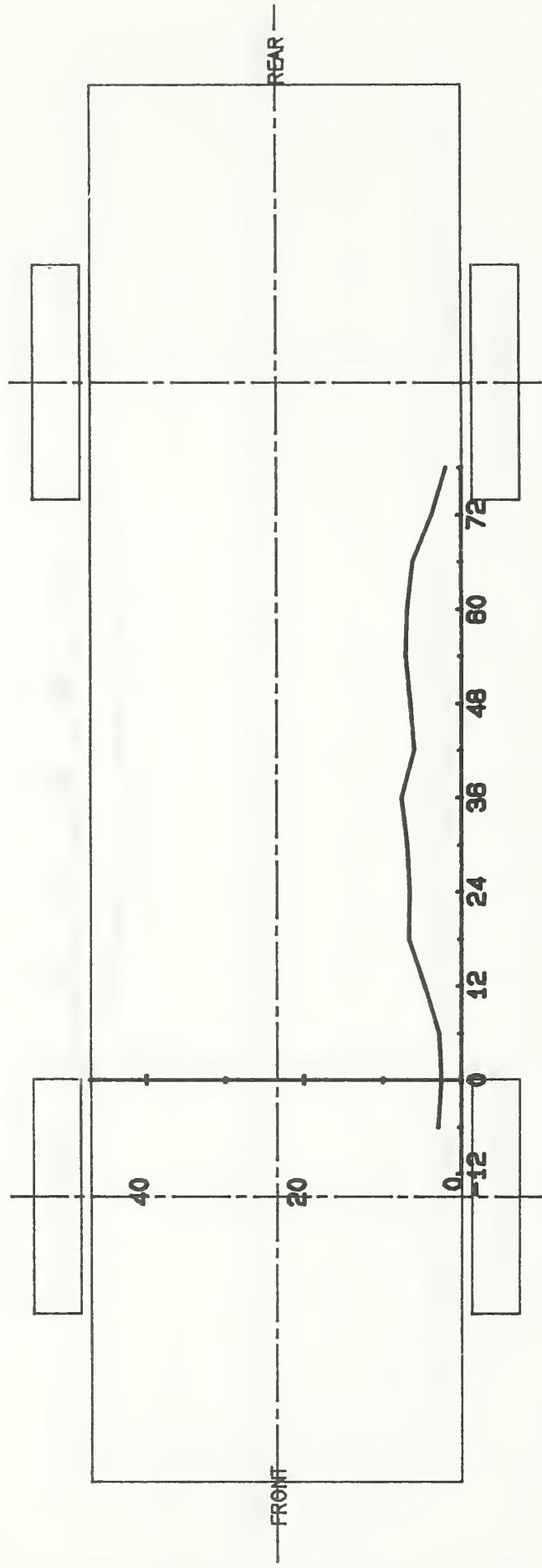
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 10.8" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.049

VEHICLE EXTERIOR STATIC CRUSH PROFILE



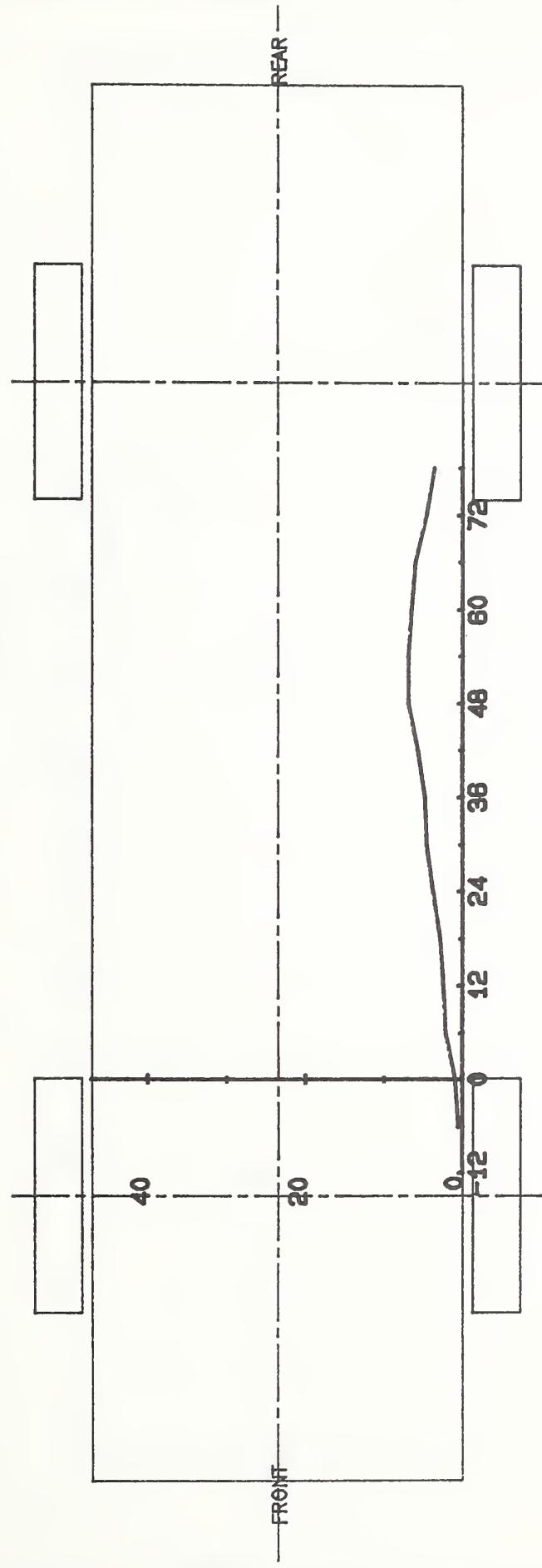
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 19.0" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.049

VEHICLE EXTERIOR STATIC CRUSH PROFILE



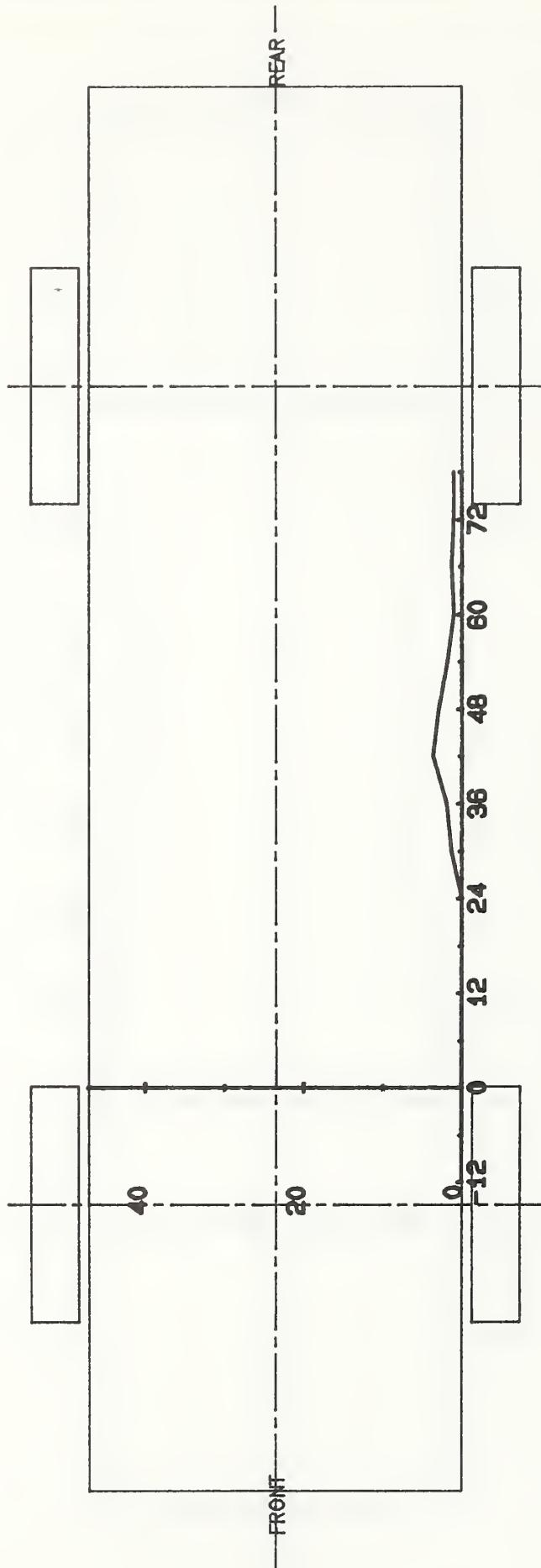
PROFILE LEVEL EQUALS MID DOOR HEIGHT WHICH IS 23.2" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.049

VEHICLE EXTERIOR STATIC CRUSH PROFILE



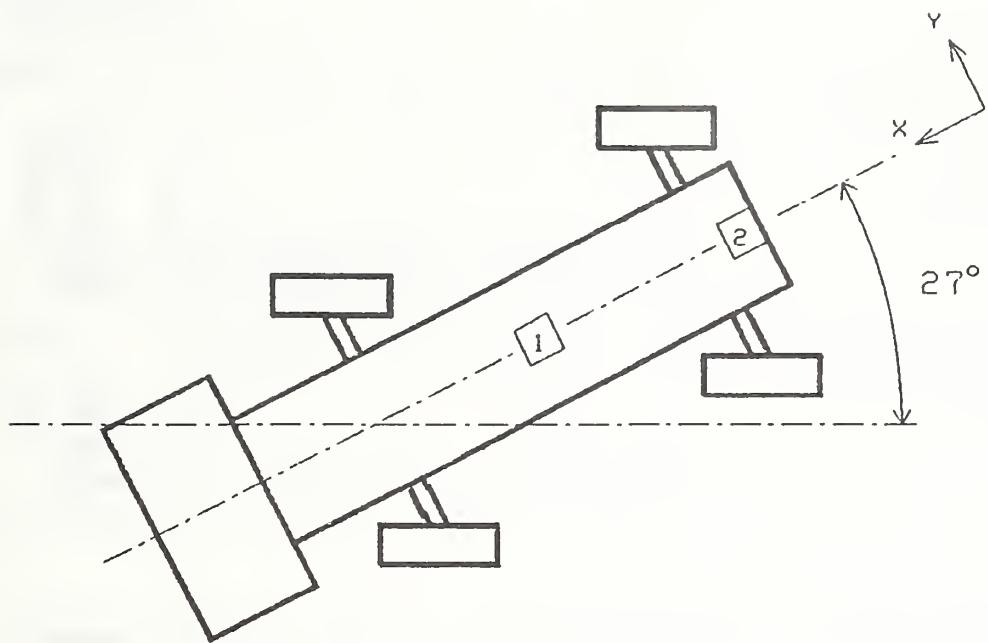
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 34.4" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.049

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 52.5" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.049

MOVING BARRIER ACCELEROMETER PLACEMENT



MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910604

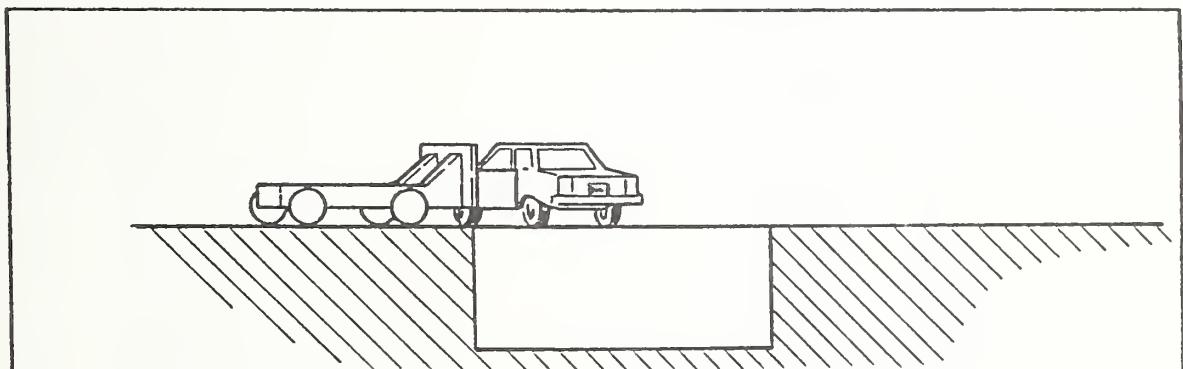
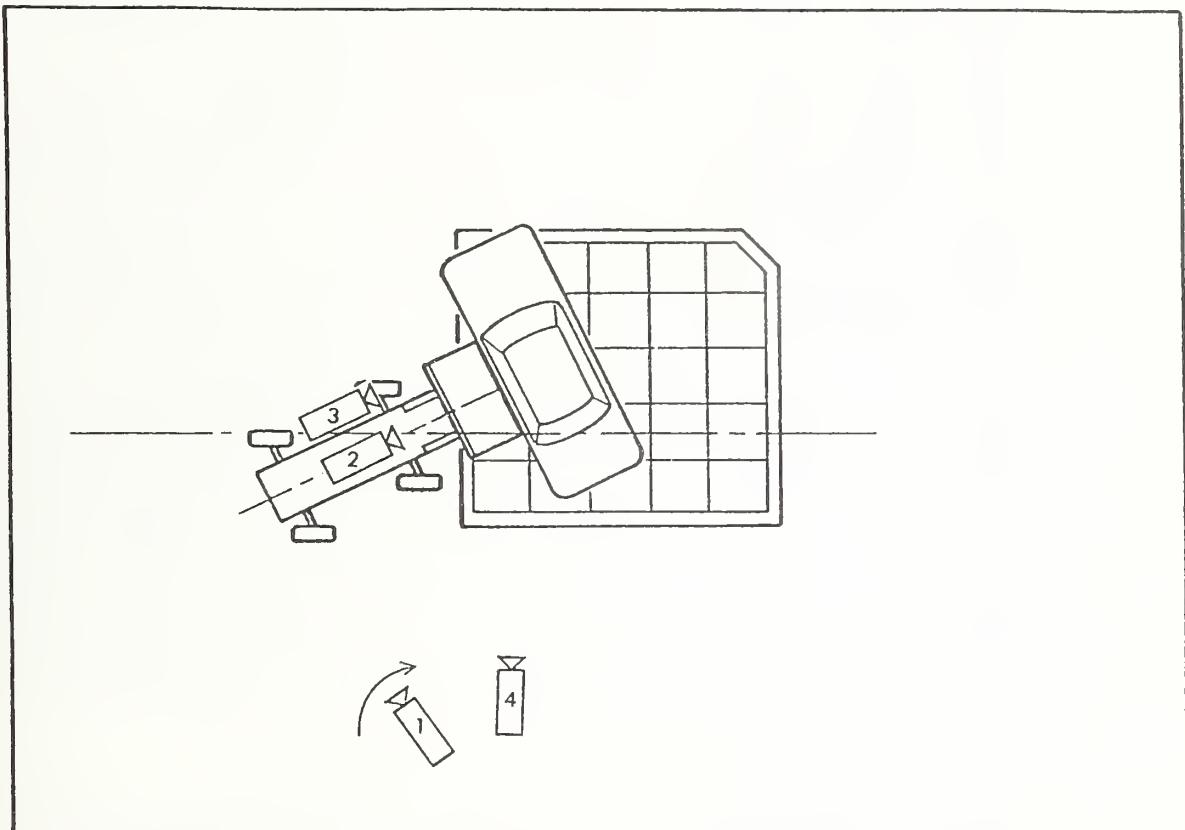
No.	LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
					DIRECTION	MAX G MSEC	DIRECTION	MAX G MSEC
1	CENTER OF GRAVITY	74.2	0.0	12.2				
	LONGITUDINAL				1.1	173.4	20.4	44.9
	LATERAL				1.6	66.8	10.1	44.0
	VERTICAL				7.6	31.8	8.5	44.9
	RESULTANT				24.3	44.8		
		Delta VX is -20.2 MPH @ 73.0 MSEC						
		Delta VY is -6.3 MPH @ 73.0 MSEC						
2	REAR FRAME MEMBER	0.0	0.0	24.0				
	LONGITUDINAL				1.8	99.6	20.6	25.3
	LATERAL				3.6	124.3	4.0	24.1
		Delta VX is -18.8 MPH @ 73.0 MSEC						
		Delta VY is -1.0 MPH @ 73.0 MSEC						

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM REAR POINT OF FRAME
 Y: + RIGHTWARD FROM BARRIER CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

All measurements of accelerometer locations in inches.

CAMERA POSITIONS



CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right panning	Kodak	16	24	Real-time documentation
2	Onboard mov. bar. wide	Photosonic 1B	13	500	Impact point
3	Onboard mov. bar. tight	Photosonic 1B	25	493	Close-up of impact point
4	Right	Photosonic 1B	25	500	Overall view

APPENDIX A

PHOTOGRAPHS

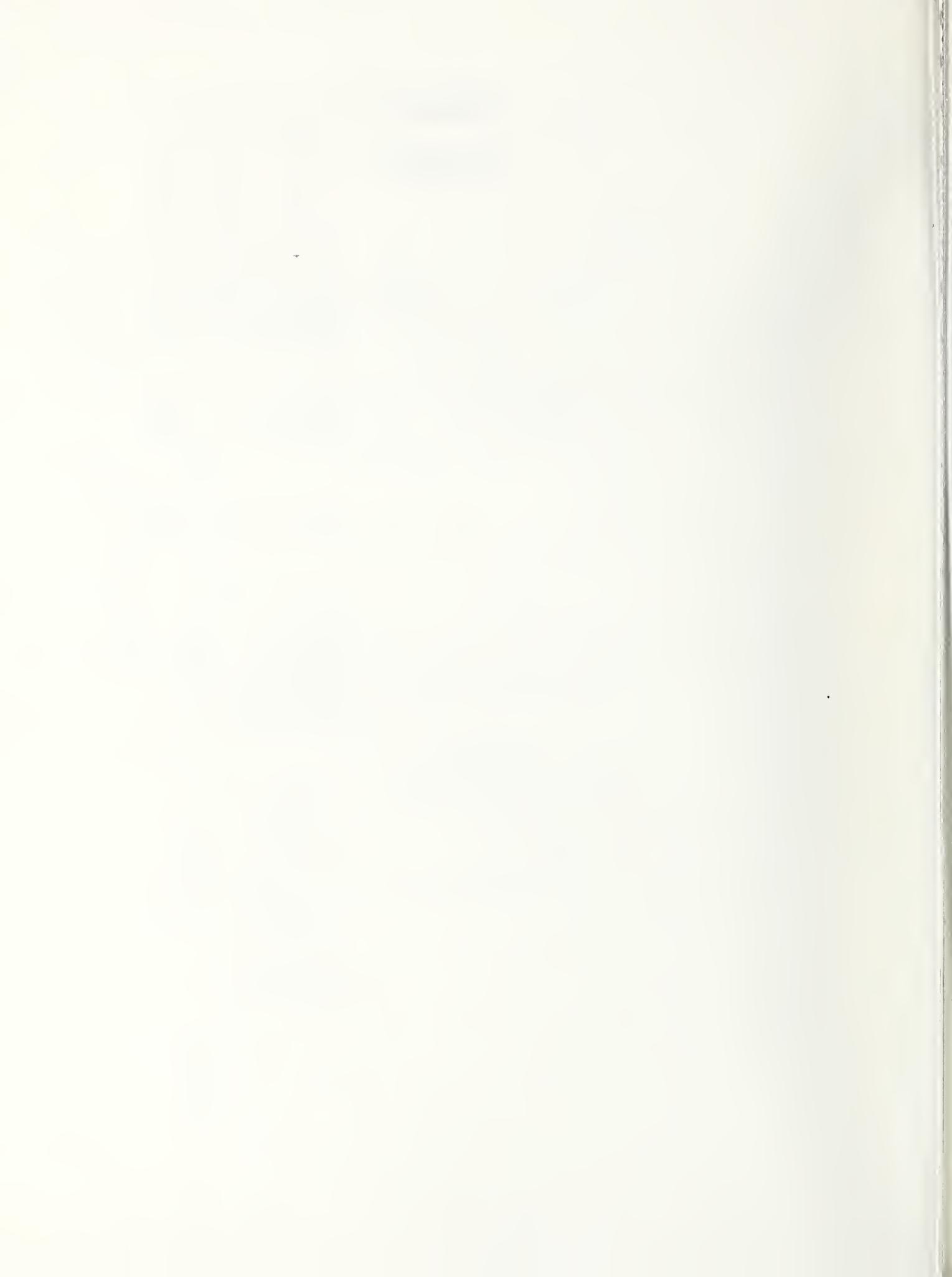




Figure A-1. PRE-TEST VEHICLE FRONT AND BARRIER VIEW

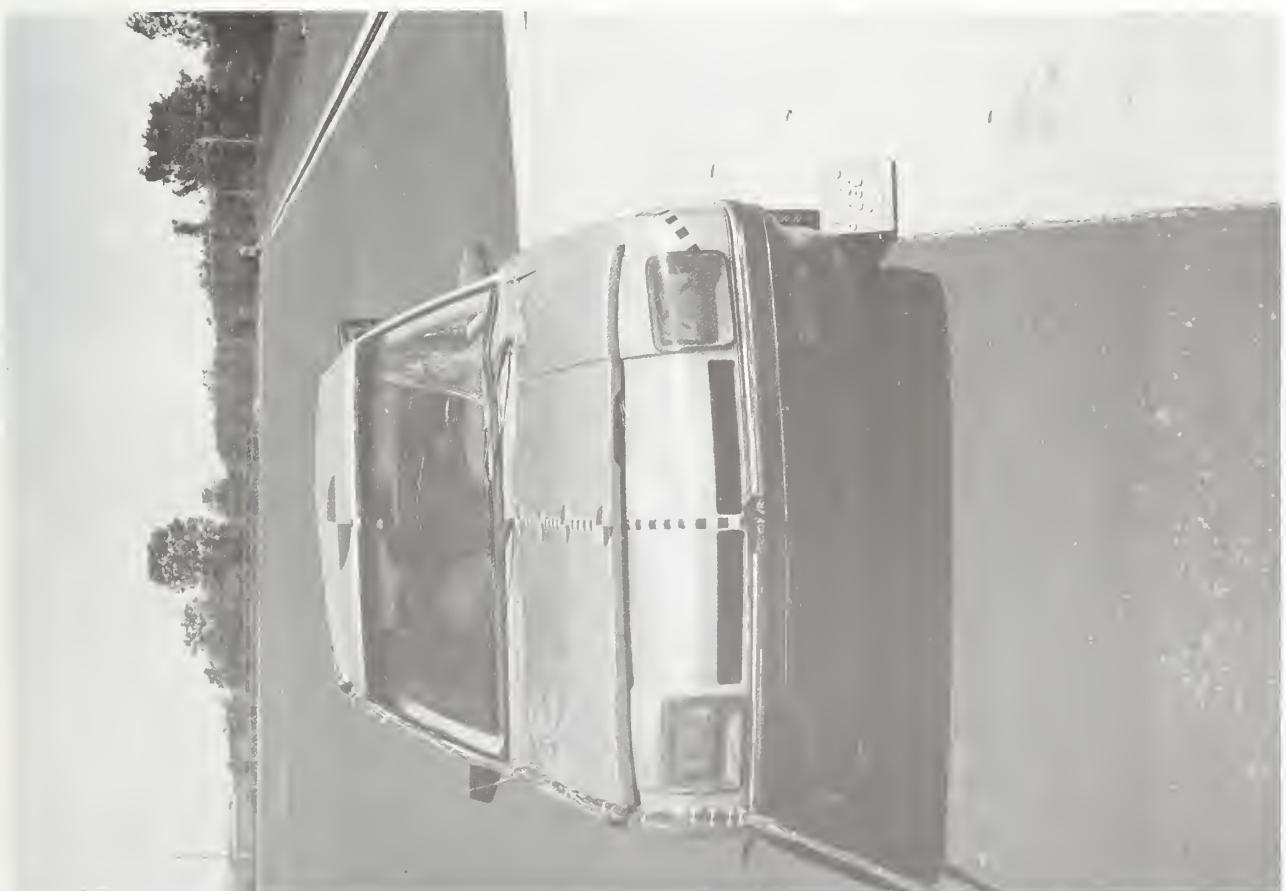


Figure A-2. POST-TEST VEHICLE FRONT VIEW



Figure A-3. PRE-TEST VEHICLE RIGHT SIDE VIEW



Figure A-4. POST-TEST VEHICLE RIGHT SIDE VIEW



Figure A-5. PRE-TEST VEHICLE REAR AND BARRIER VIEW



Figure A-6. POST-TEST VEHICLE REAR VIEW



Figure A-7. PRE-TEST VEHICLE LEFT SIDE AND BARRIER VIEW



Figure A-8. PRE-TEST VEHICLE LEFT SIDE VIEW



Figure A-9. POST-TEST VEHICLE LEFT SIDE VIEW



Figure A-10. PRE-TEST VEHICLE LEFT FRONT VIEW



Figure A-11. POST-TEST VEHICLE LEFT FRONT VIEW



Figure A-12. PRE-TEST VEHICLE LEFT REAR VIEW



Figure A-13. POST-TEST VEHICLE LEFT REAR VIEW



Figure A-14. PRE-TEST VEHICLE LEFT FRONT CLOSE-UP VIEW



Figure A-15. PRE-TEST VEHICLE RIGHT REAR VIEW

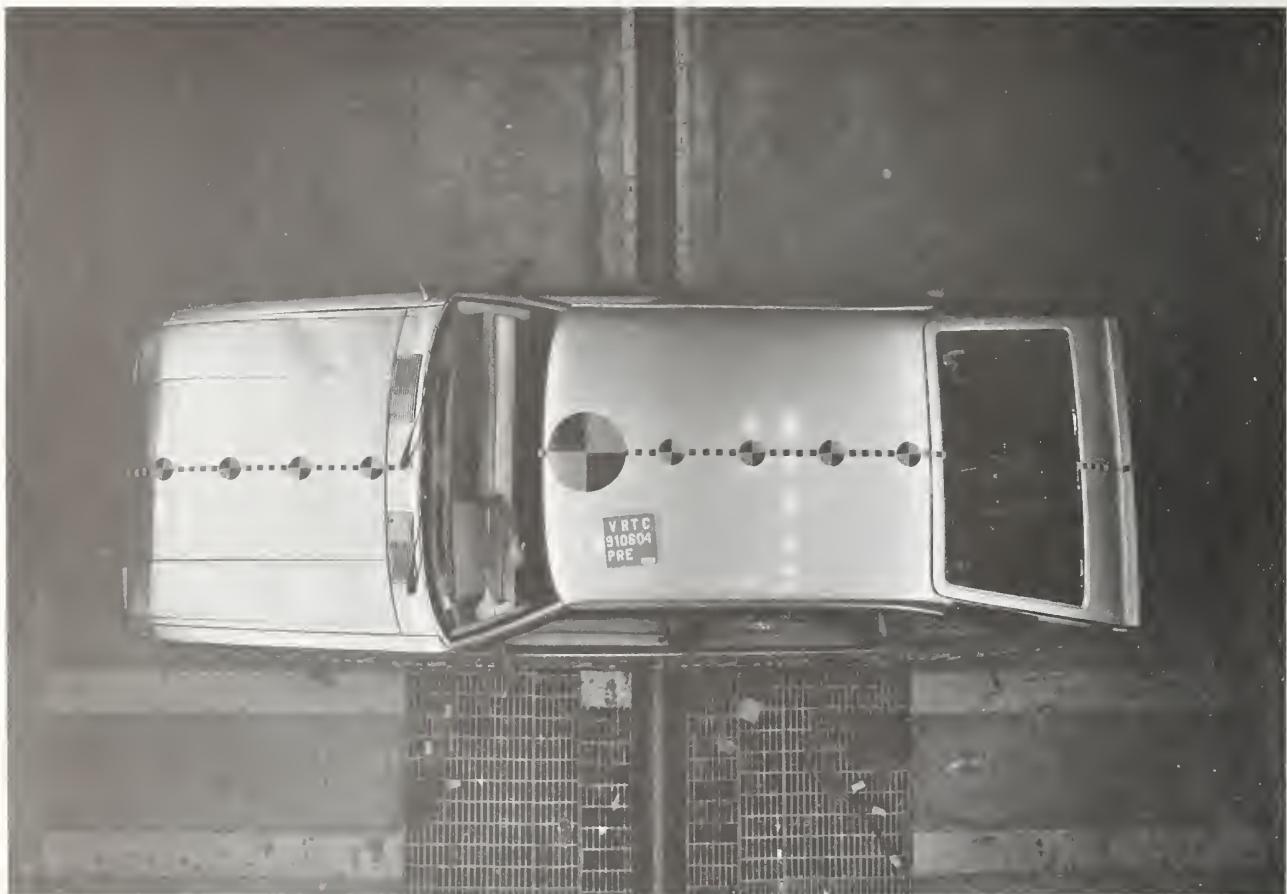


Figure A-16. PRE-TEST VEHICLE TOP VIEW

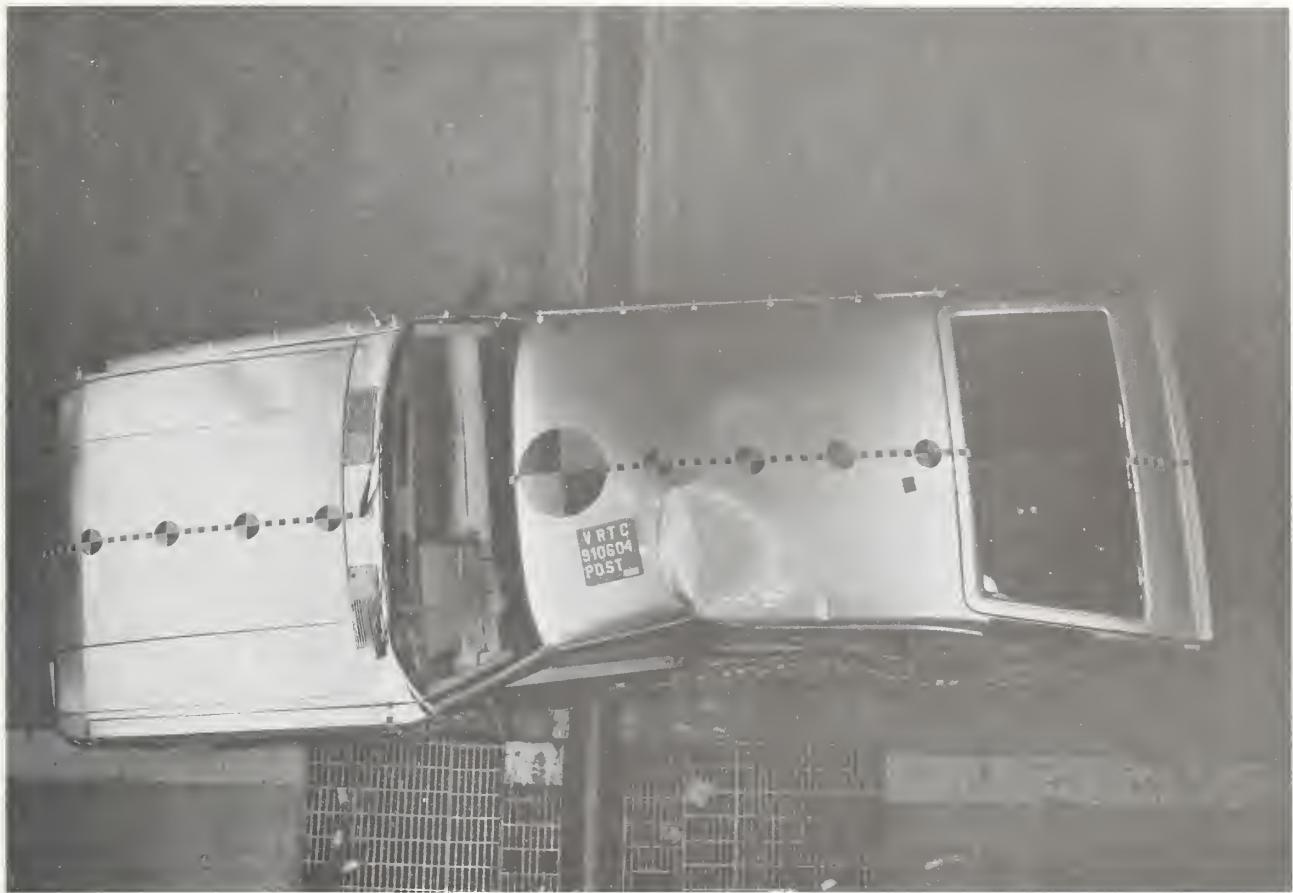


Figure A-17. POST-TEST VEHICLE TOP VIEW



Figure A-18. PRE-TEST DRIVER DUMMY - VIEW 1



Figure A-19. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-20. PRE-TEST DRIVER DUMMY - VIEW 3



Figure A-21. POST-TEST DRIVER DUMMY VIEW



Figure A-22. PRE-TEST PASSENGER DUMMY - VIEW 1



Figure A-23. PRE-TEST PASSENGER DUMMY - VIEW 2



Figure A-24. PRE-TEST PASSENGER DUMMY - VIEW 3



Figure A-25. POST-TEST PASSENGER DUMMY VIEW



Figure A-26. POST-TEST DRIVER DUMMY CONTACT - VIEW 1



Figure A-27. POST-TEST DRIVER DUMMY CONTACT - VIEW 2



Figure A-28. POST-TEST PASSENGER DUMMY CONTACT - VIEW 1



Figure A-29. POST-TEST PASSENGER DUMMY CONTACT - VIEW 2

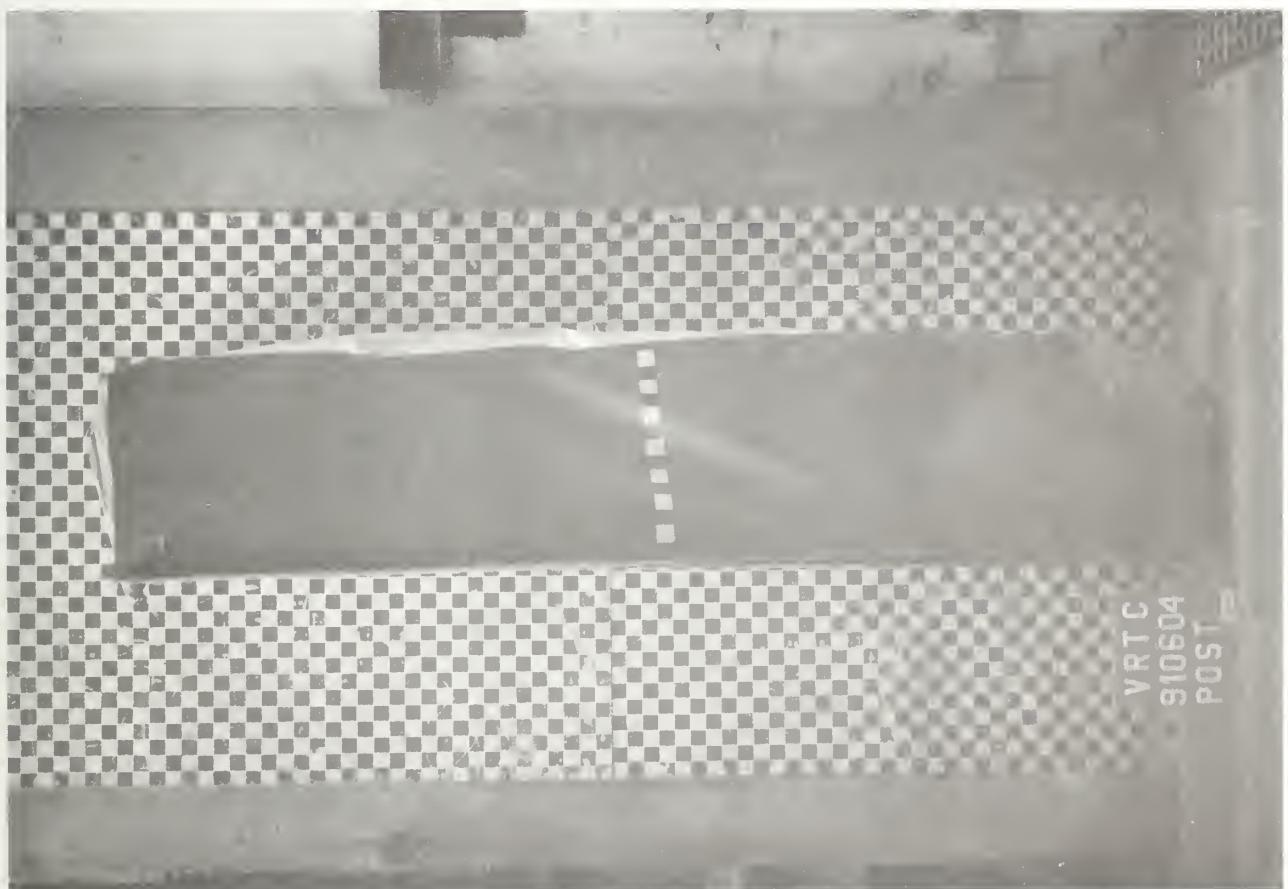


Figure A-30. POST-TEST MOVING DEFORMABLE BARRIER - VIEW 1

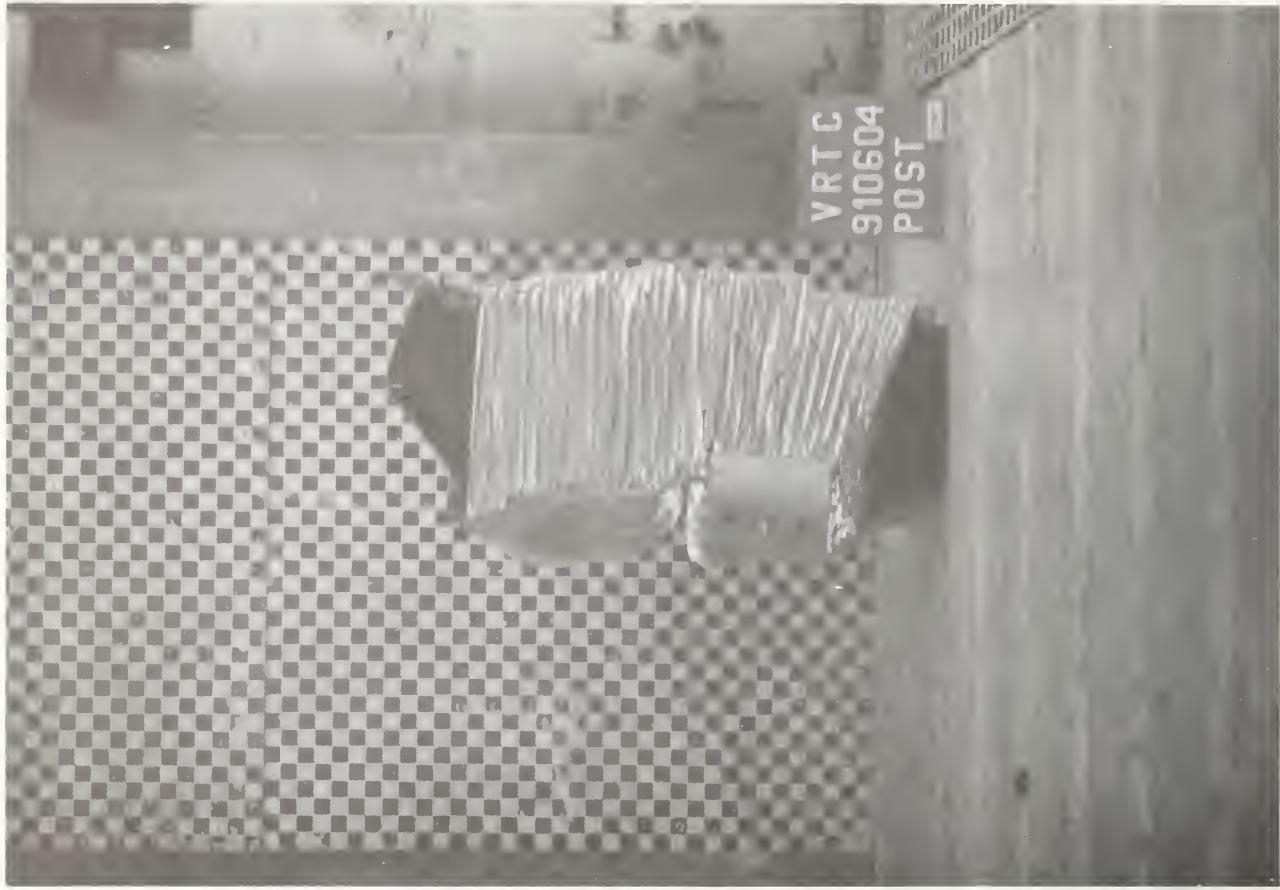
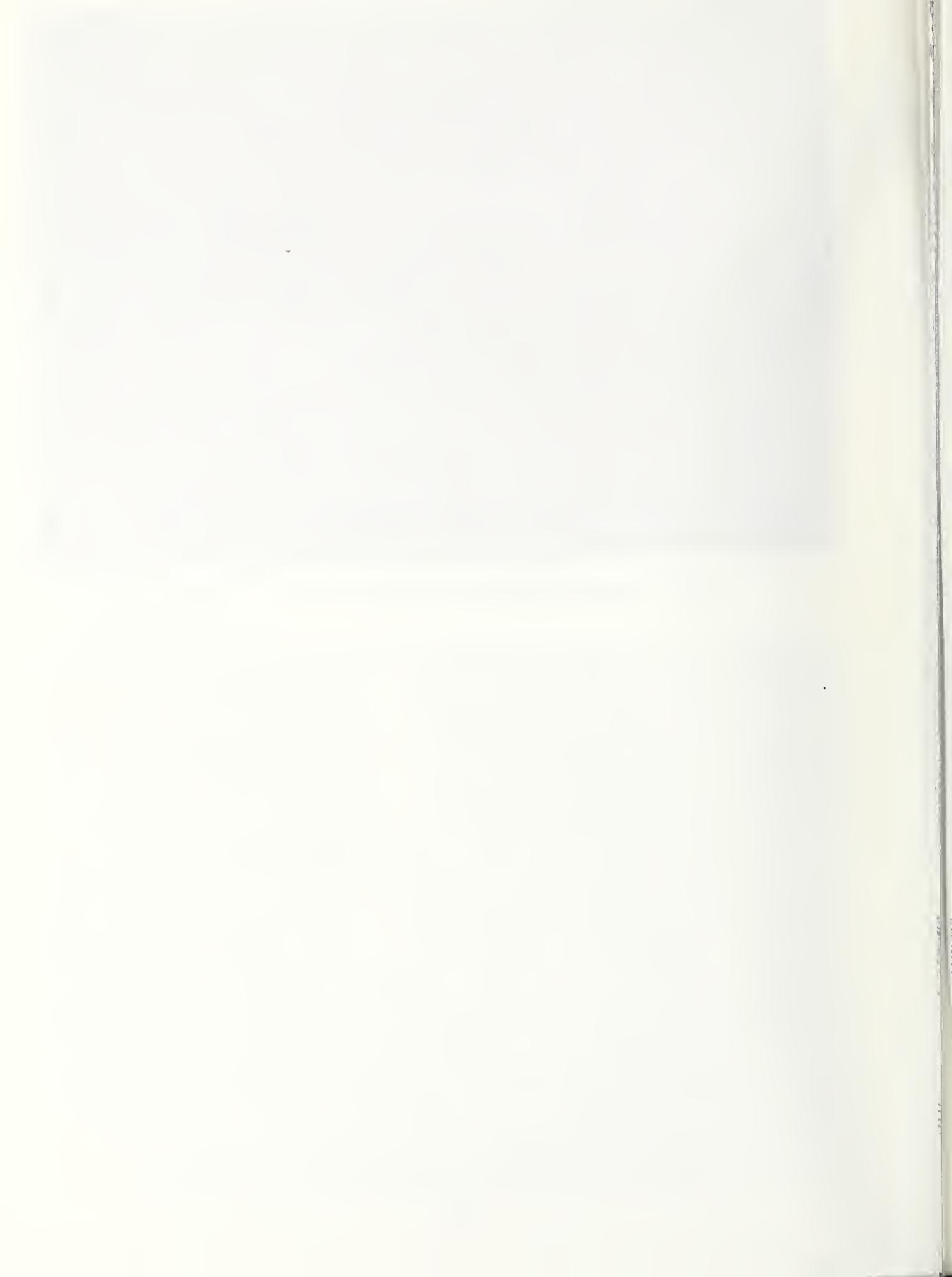


Figure A-31. POST-TEST MOVING DEFORMABLE BARRIER - VIEW 2

APPENDIX B

DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data were filtered according to SAE J211 OCT88 except that dummy thorax and pelvis data were filtered using the HSRI filter.



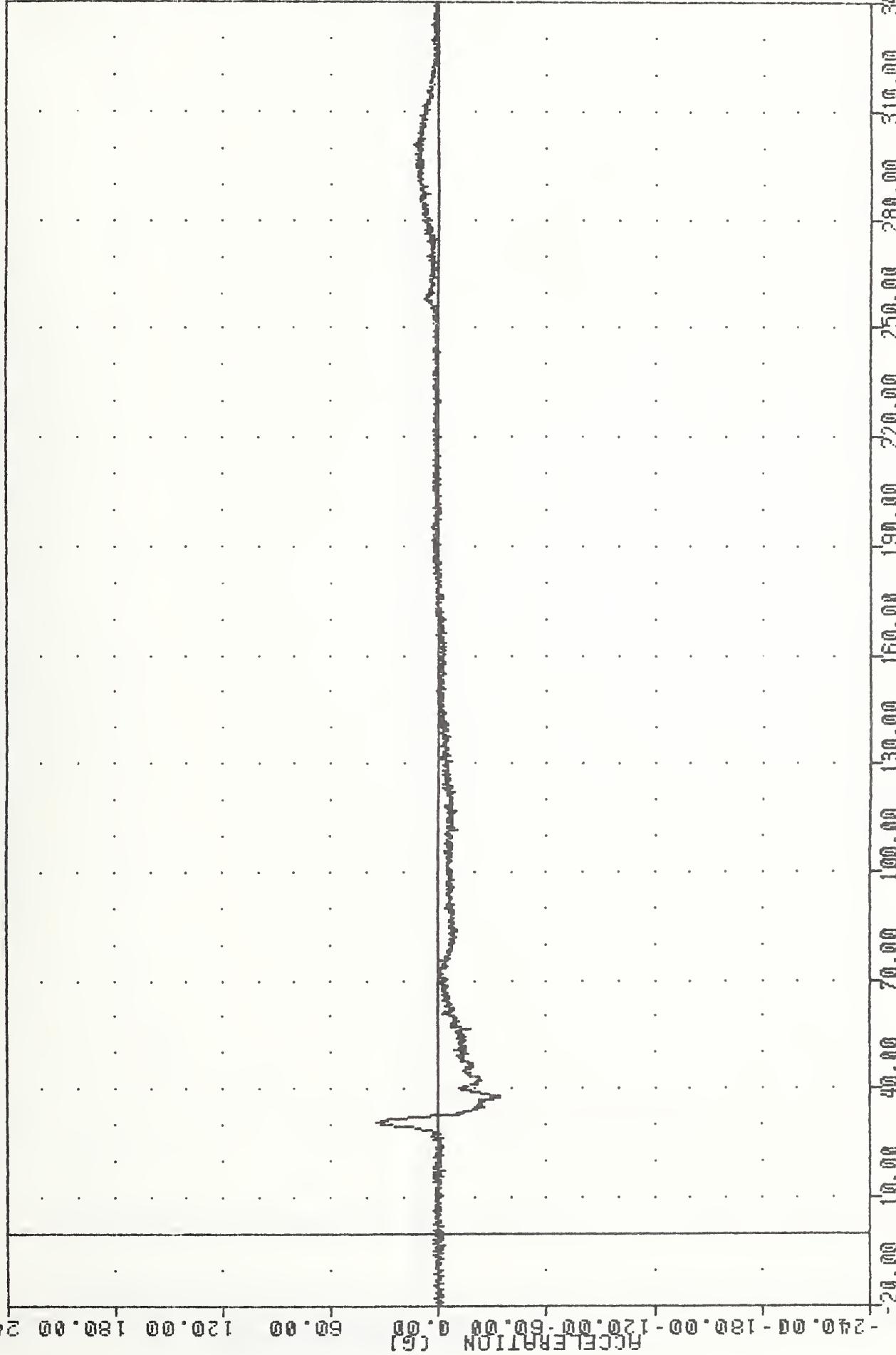
YRTC 910604

LEFT SIDE IMPACT

91155

HEDXG1

FILTER = HLPF 1650/ 5214/-40
MIN, MAX VALUES = -33.948 38.000
35.148 30.63

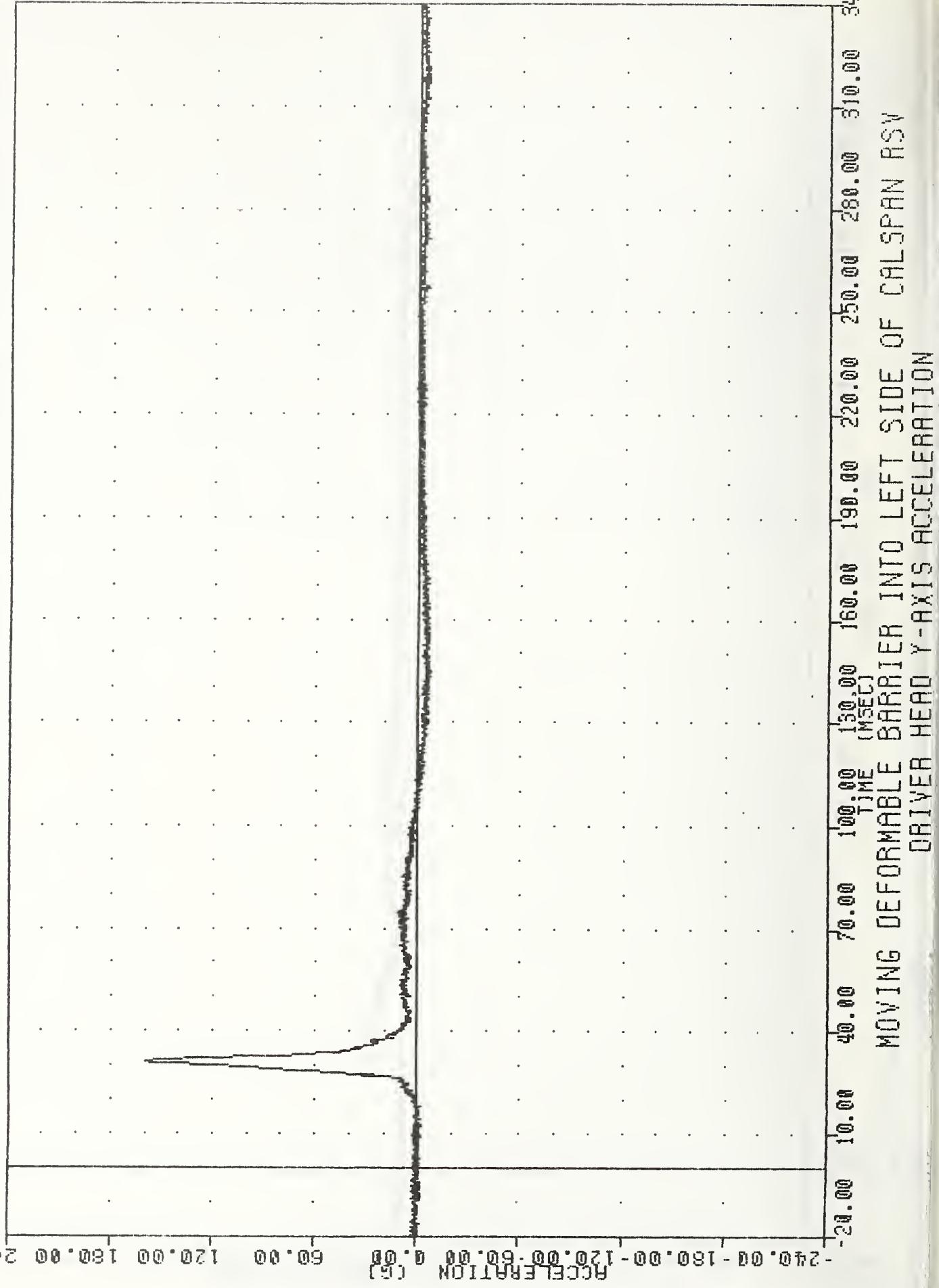


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER HERD X-AXIS ACCELERATION

WRTC 910604
LEFT SIDE IMPACT

91155
HEDY61

FILTER = RLPF 1650/ 5214/ -40
MIN. MAX VALUES = -7.298 144.88 , 159.34 & 31.13

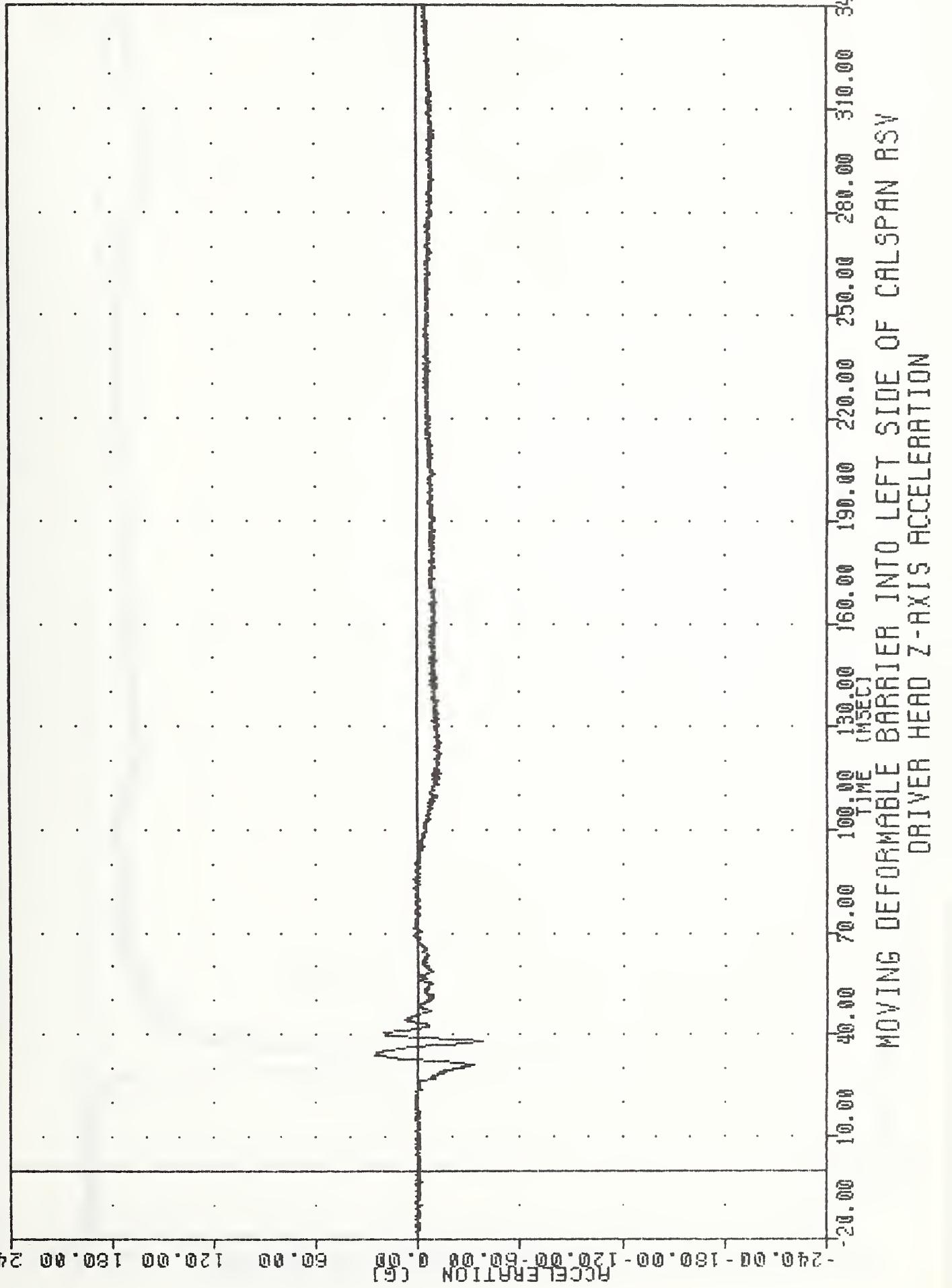


VRTC 910604

LEFT SIDE IMPACT

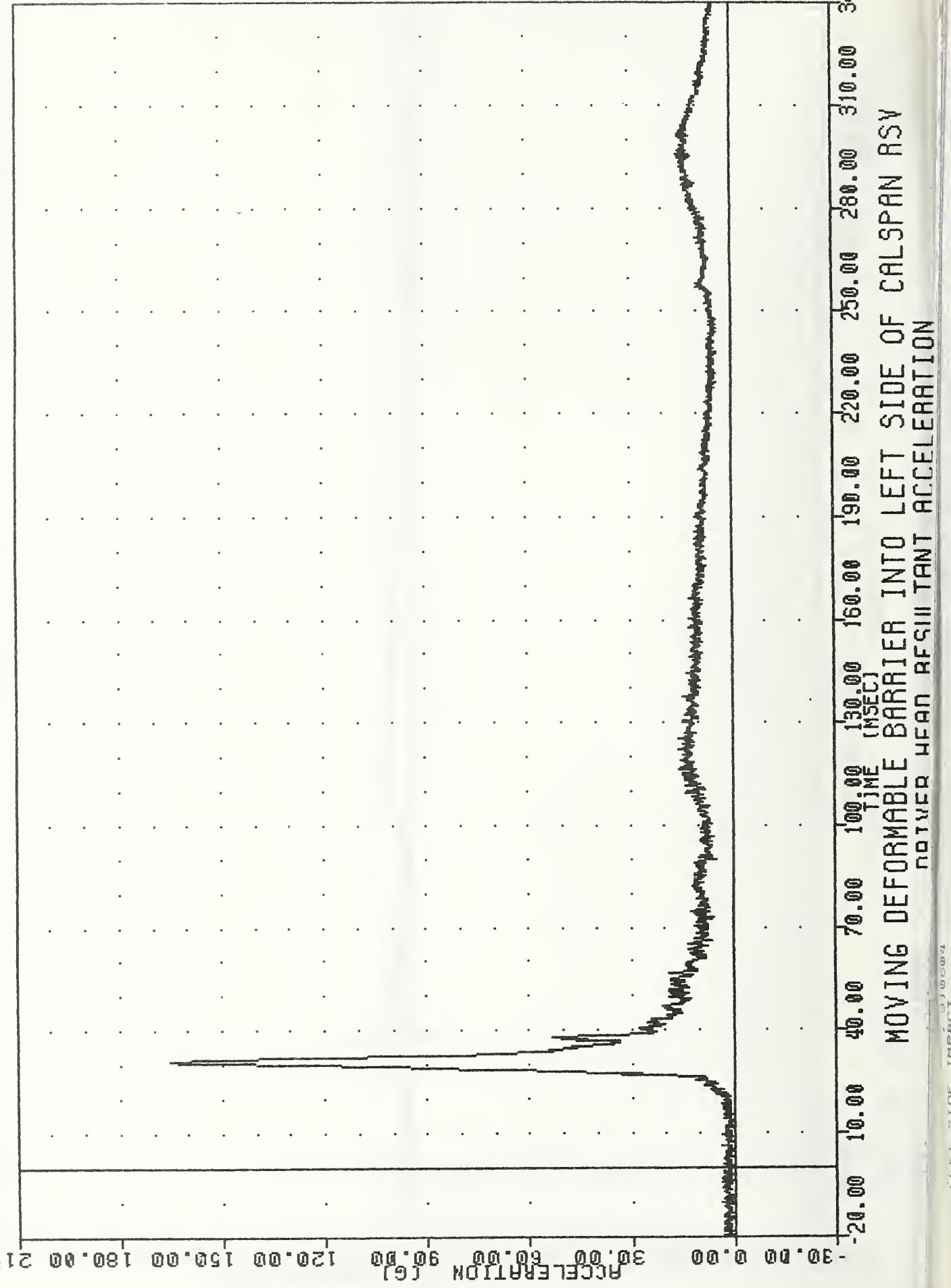
91155
HEDZ1

FILTER = ALPF 1650/ 5214/-40
MIN. MAX VALUES = -38.358 38.13 25.87 @ 33.68



910604
LEFT SIDE IMPACT
91155
HEDRG1

VRTC
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.20 e 13.50 . 165.48 e 31.00

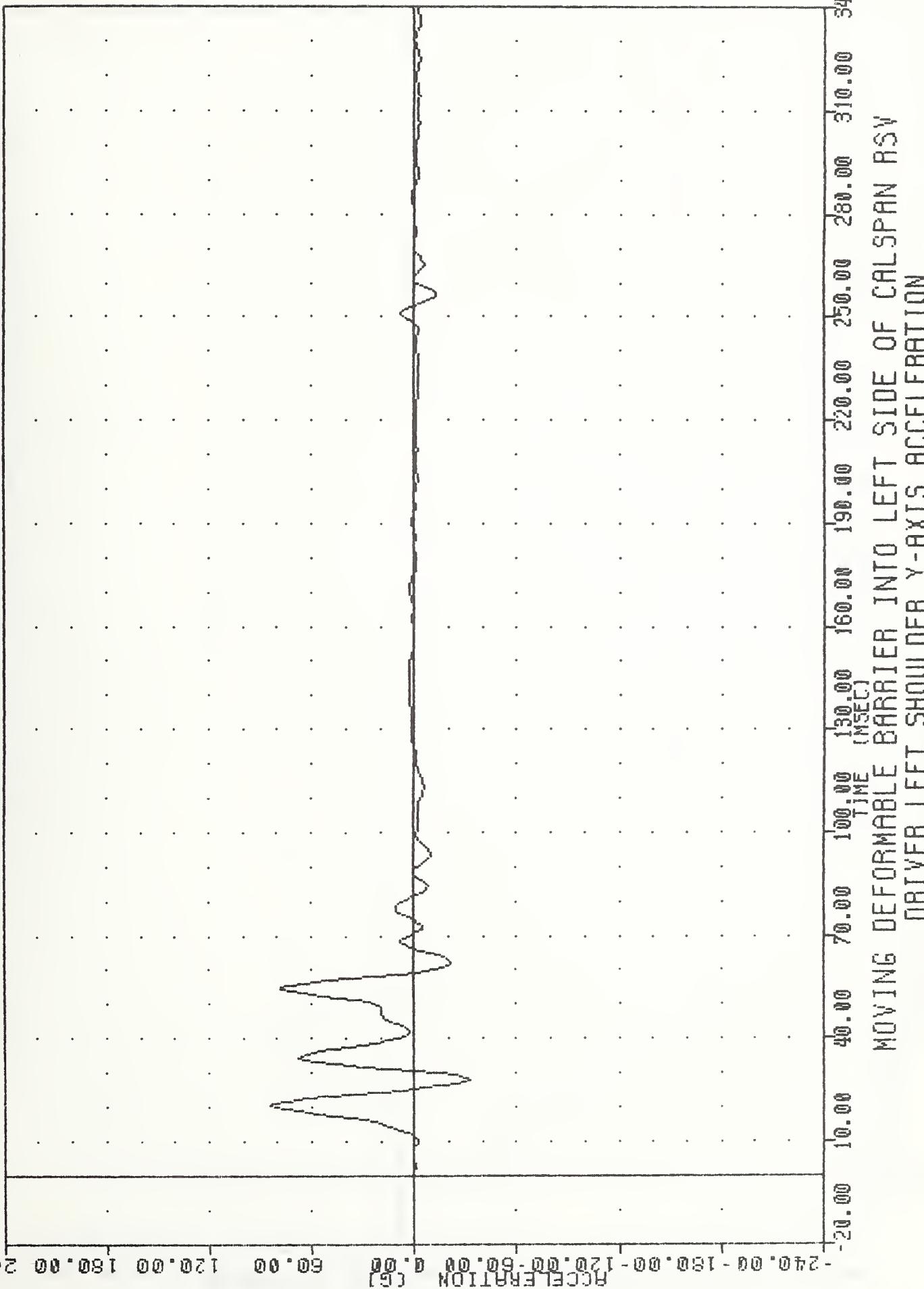


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
TEST NUMBER: 910604

WTIC
LEFT SIDE IMPACT

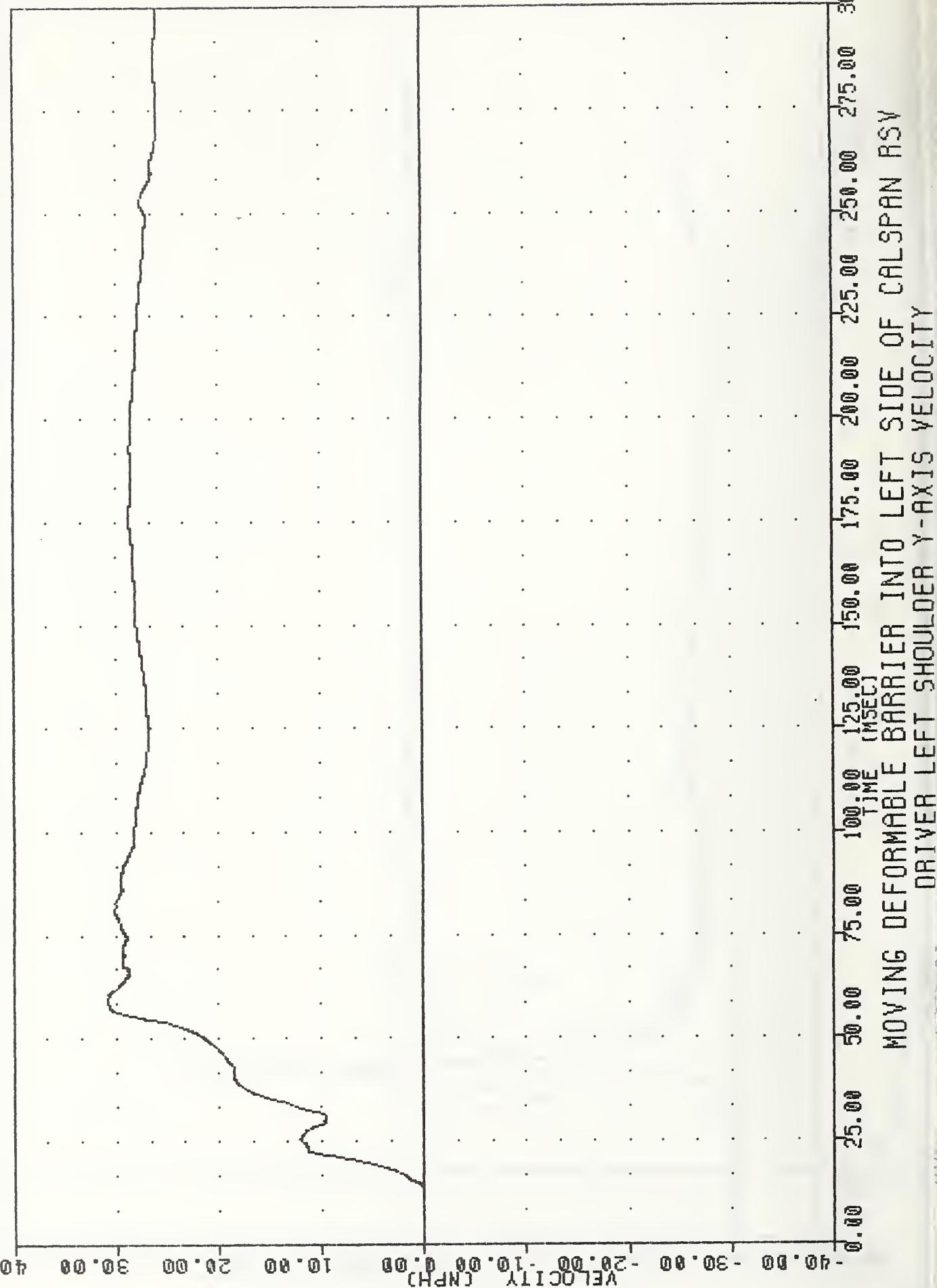
91155
SHLY61

FILTER = HSRC 136/ 189/ -50
MIN, MAX VALUES = -32.148 28.13 , 83.84 @ 20.62



VRTC
LEFT SIDE IMPACT
91155
SHLYV1

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.048 13.00 , 30.87 & 59.00

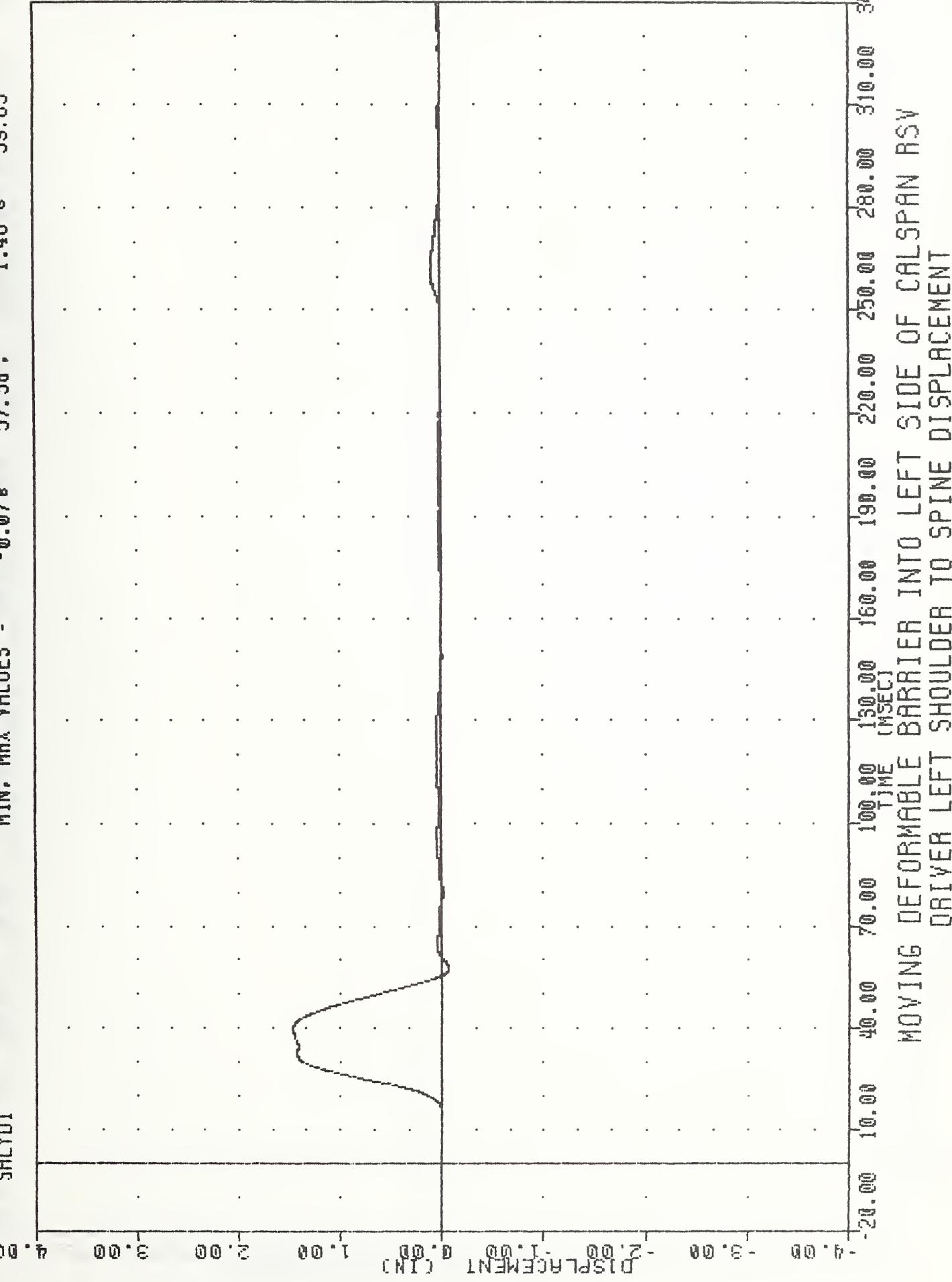


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LEFT SHOULDER TO SPINE DISPLACEMENT

VRTC 910604
LEFT SIDE IMPACT

91155
SHLYD1

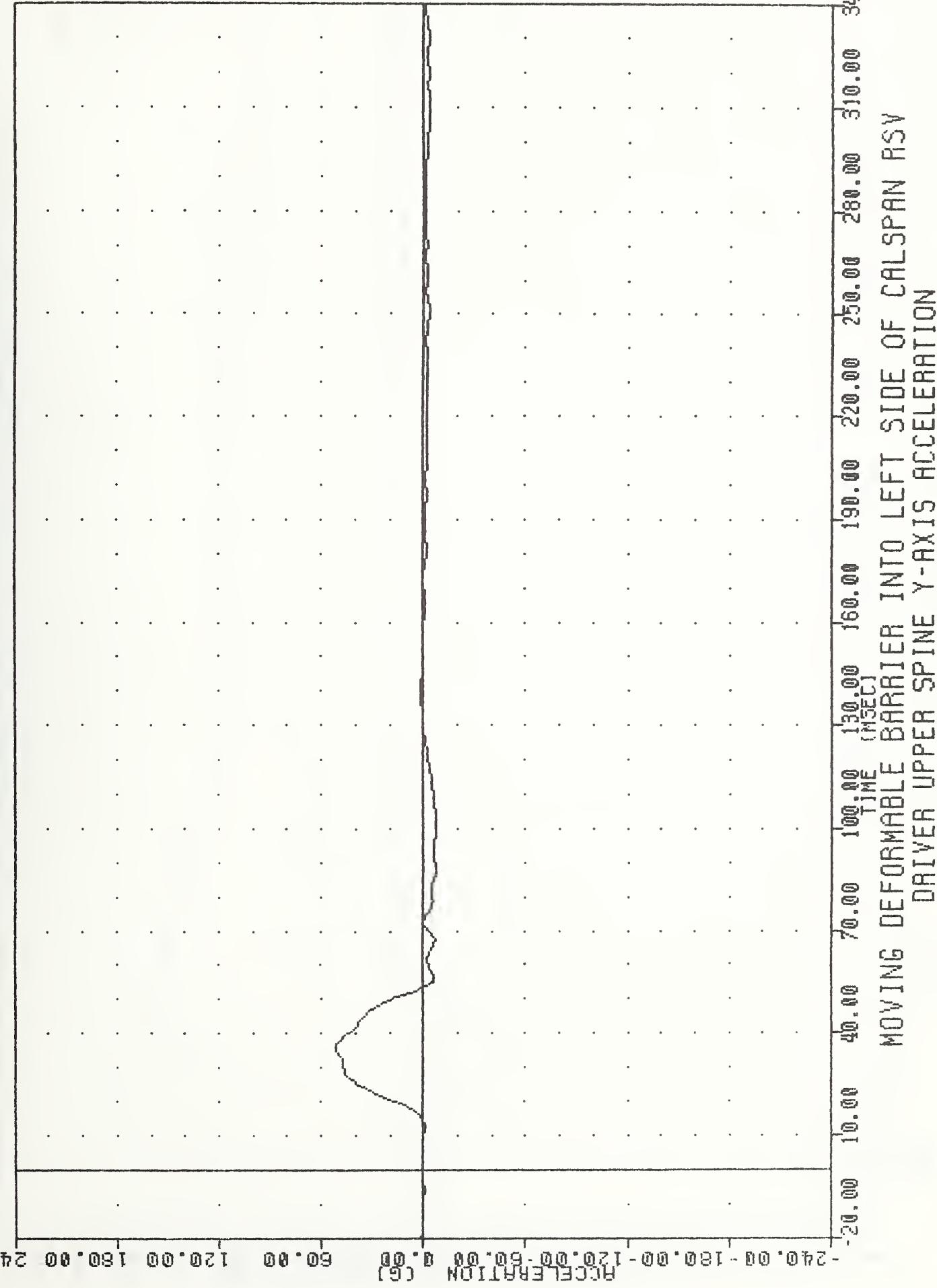
FILTER = BLPF 3000, 949/-40
MIN. MAX VALUES = -0.078 57.38 . 1.46 & 39.63



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN HS-
DRIVER UPPER SPINE X-AXIS ACCELERATION

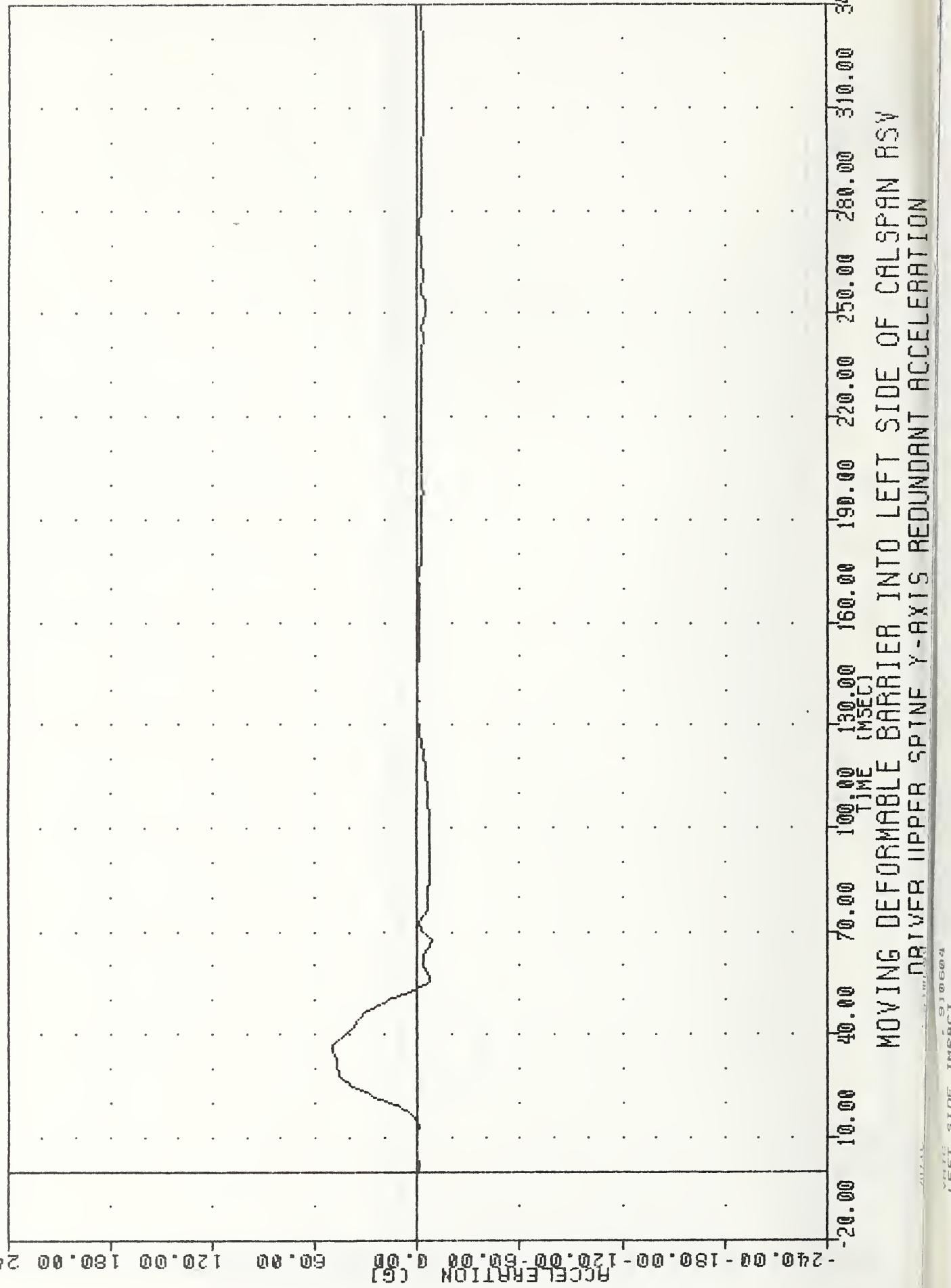
YRTC : SJ0604
LEFT SIDE IMPACT
91155
T01Y61

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -7.142 88.13 . 51.55 & 36.25



VRIC
LEFT SIDE IMPACT
91155
101YGA

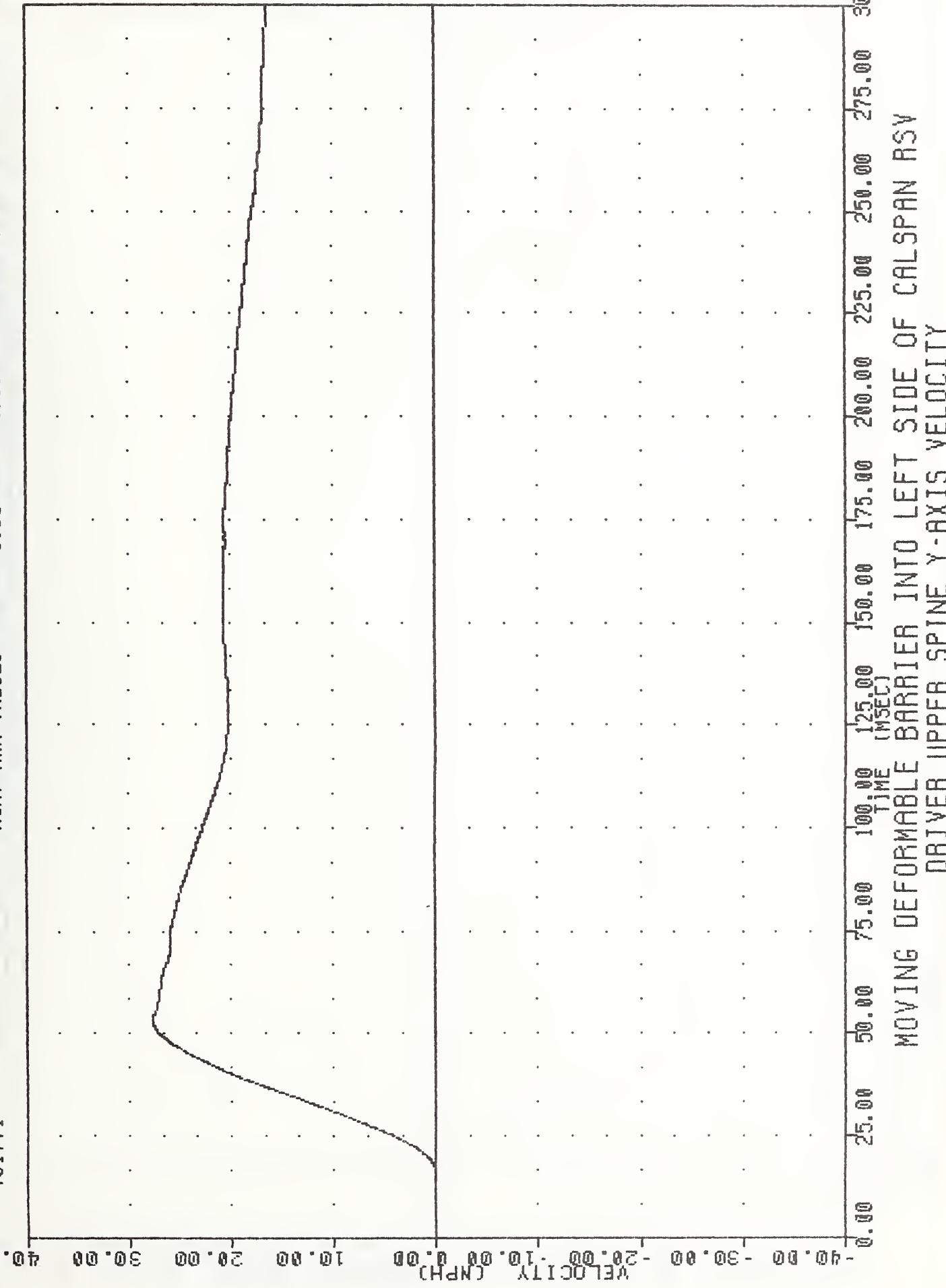
FILTER = HSRI 136/
MIN, MAX VALUES = -8.16^a 66.87 , 49.87 ^a 36.25



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER UPPER SPINE Y-AXIS VELOCITY

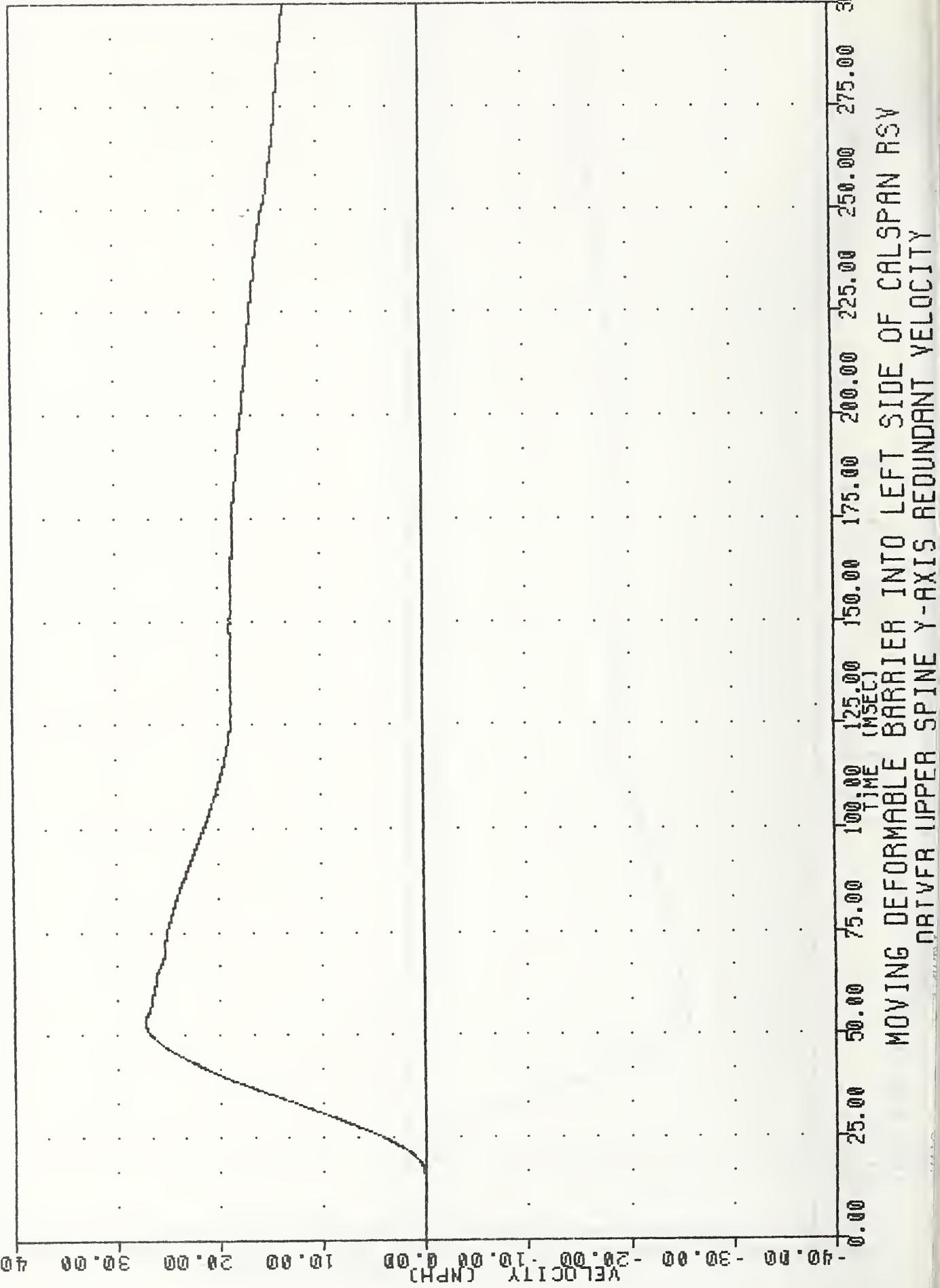
VRTC
LEFT SIDE IMPACT
91155
1017V1

FILTER = ALPF 1650/ 5214/-40
MIN, MAX VALUES = -0.010 13.50 . 27.61 . 53.75



VRTC
LEFT SIDE IMPACT
91155
101YVA

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.012 4.00
27.18 253.25

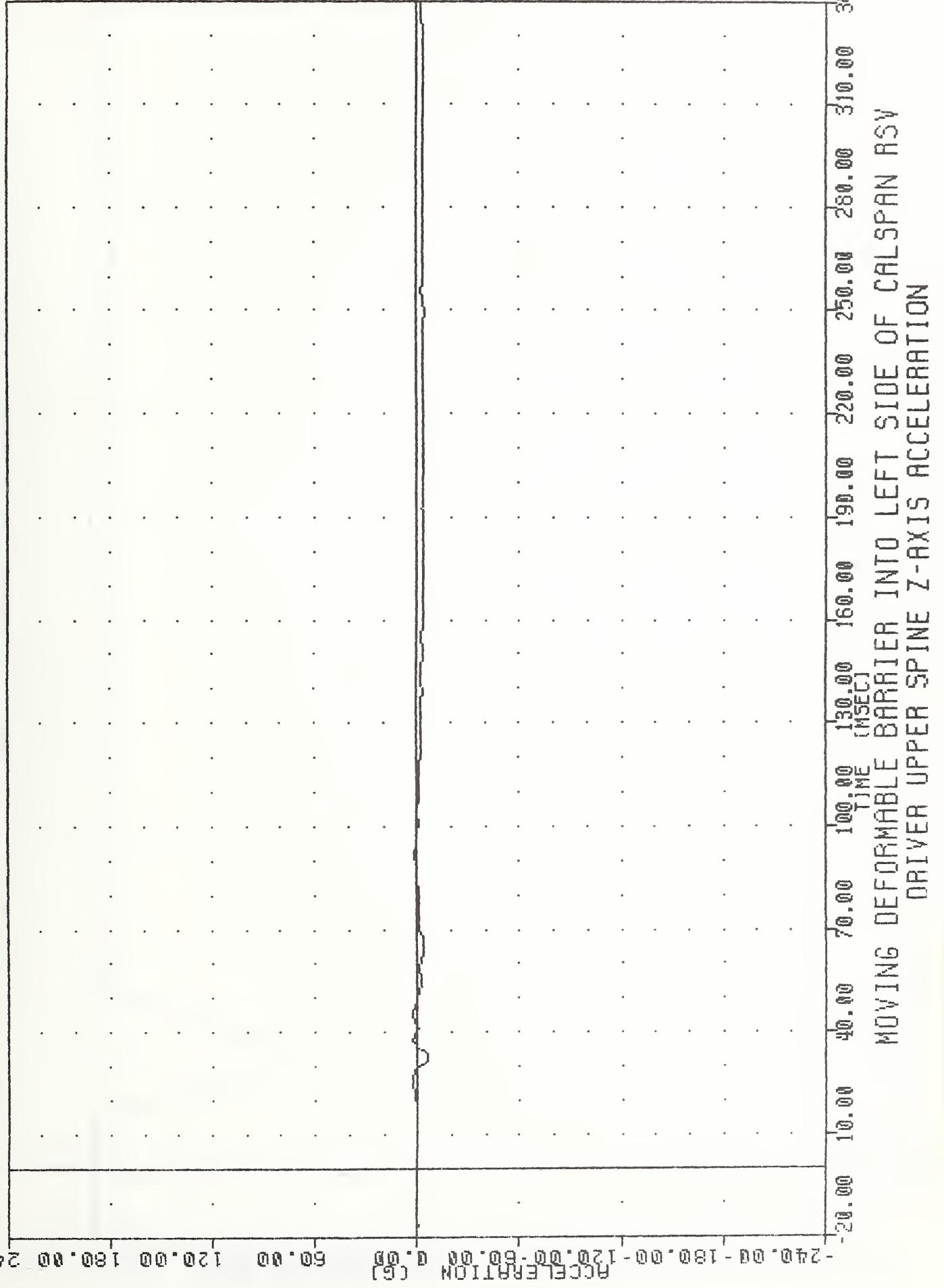


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER UPPER SPINE Y-AXIS REDUNDANT VELOCITY

YETC 910604
LEFT SIDE IMPACT

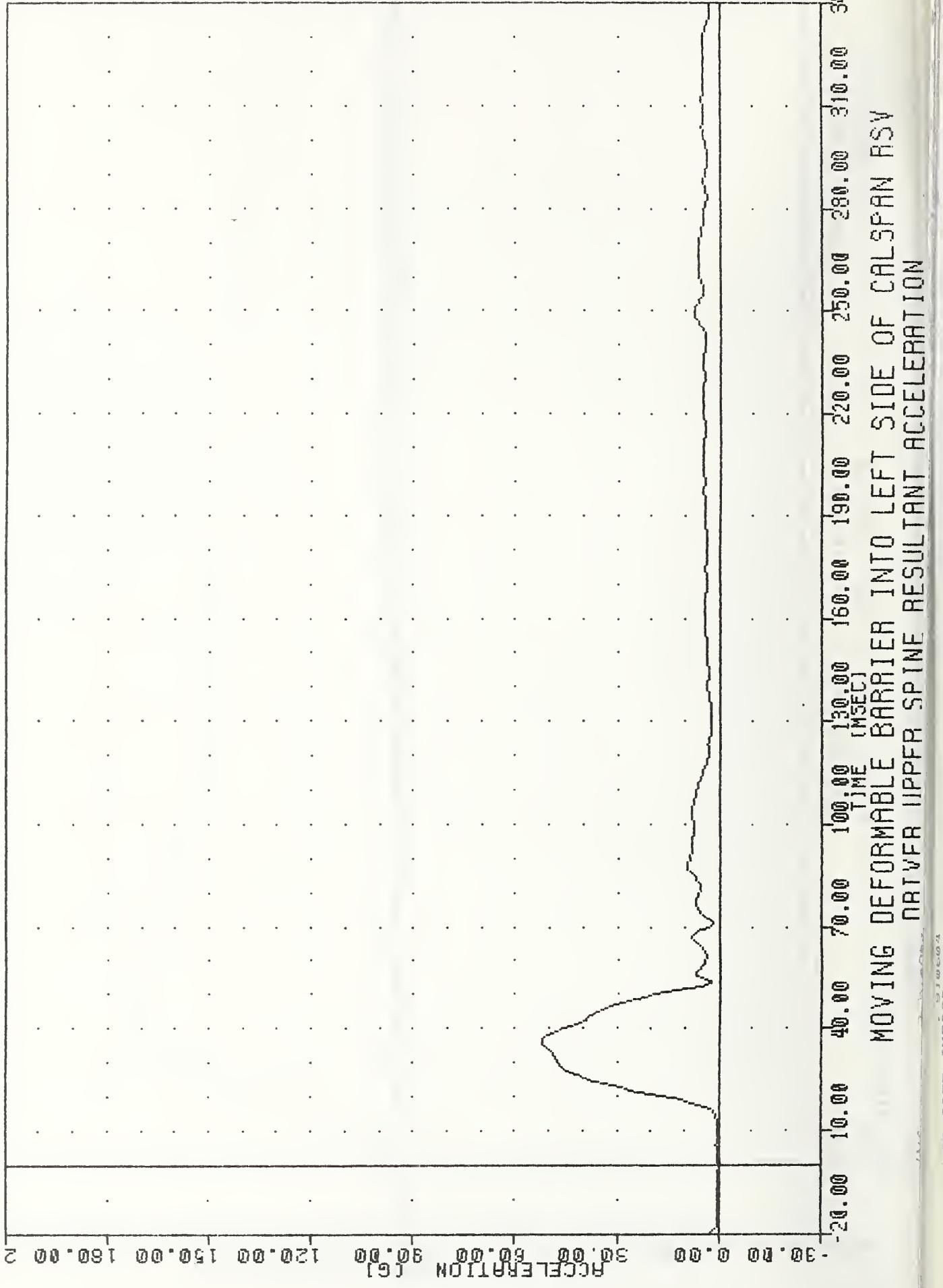
91155
101261

FILTER = HSRI 136/
MIN. MAX VALUES = -6.21@ 33.13 , 3.19 @ 26.25



VRTC 910604
LEFT SIDE IMPACT
91155
T01RG1

FILTER = HSRI 136/
MIN. MAX VALUES = 0.08@ -0.63@ 52.08@ 36.88

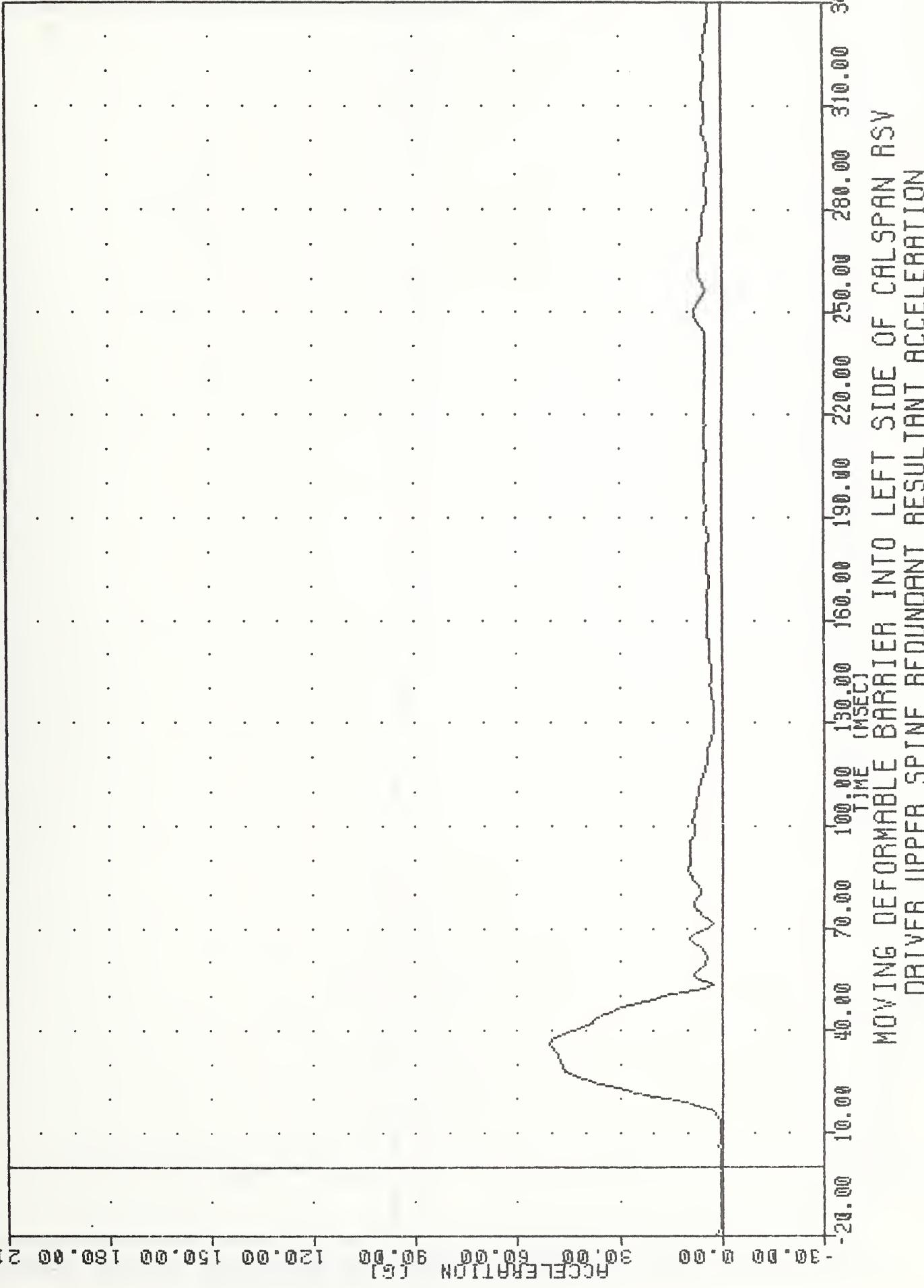


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER UPPER SPINE RESULTANT ACCELERATION

WRTC 910604
LEFT SIDE IMPACT

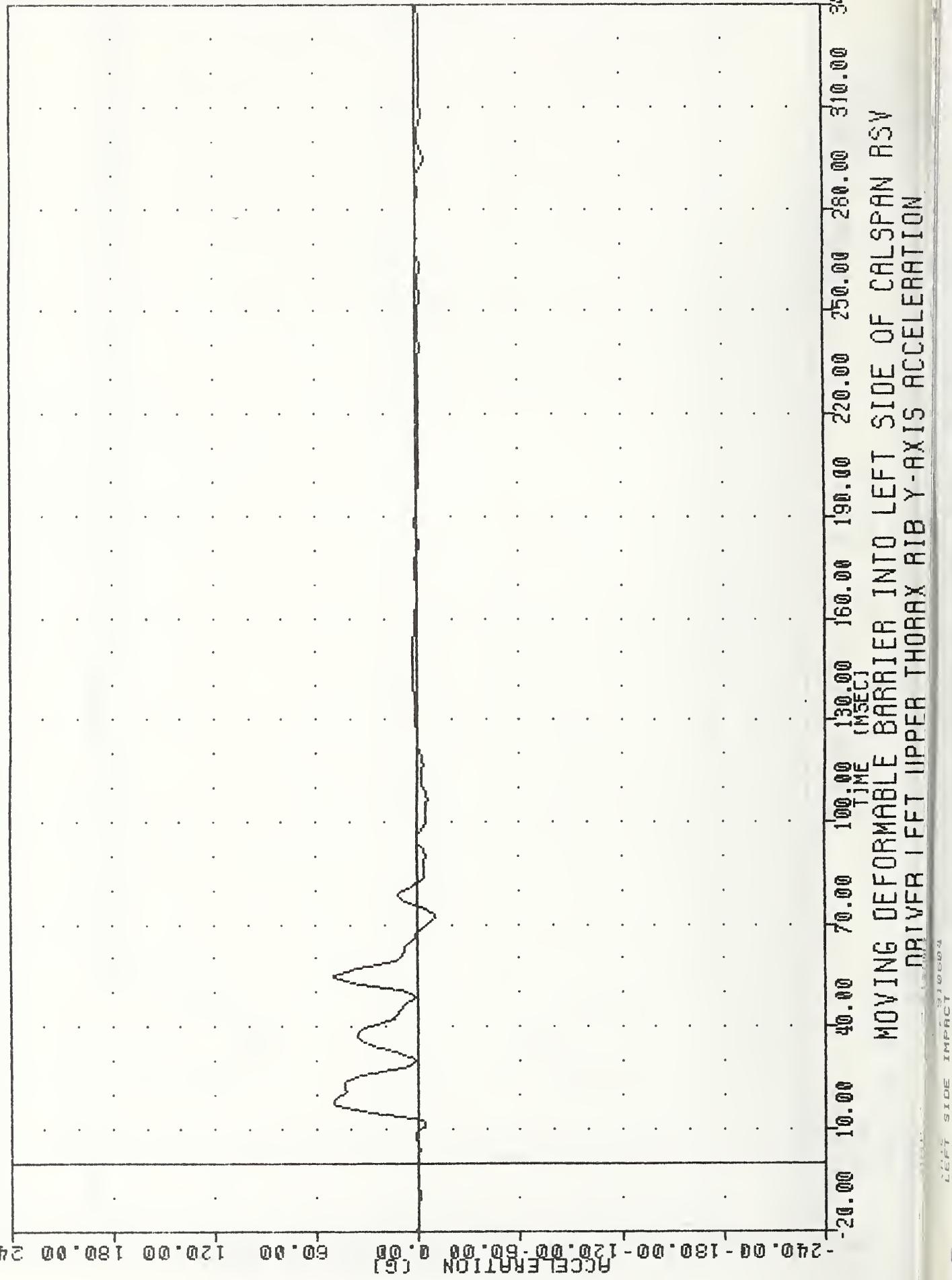
91155
T@1RGA

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = 0.138 -1.25 - 50.40 0 36.25



VRTC
LEFT SIDE IMPACT
91155

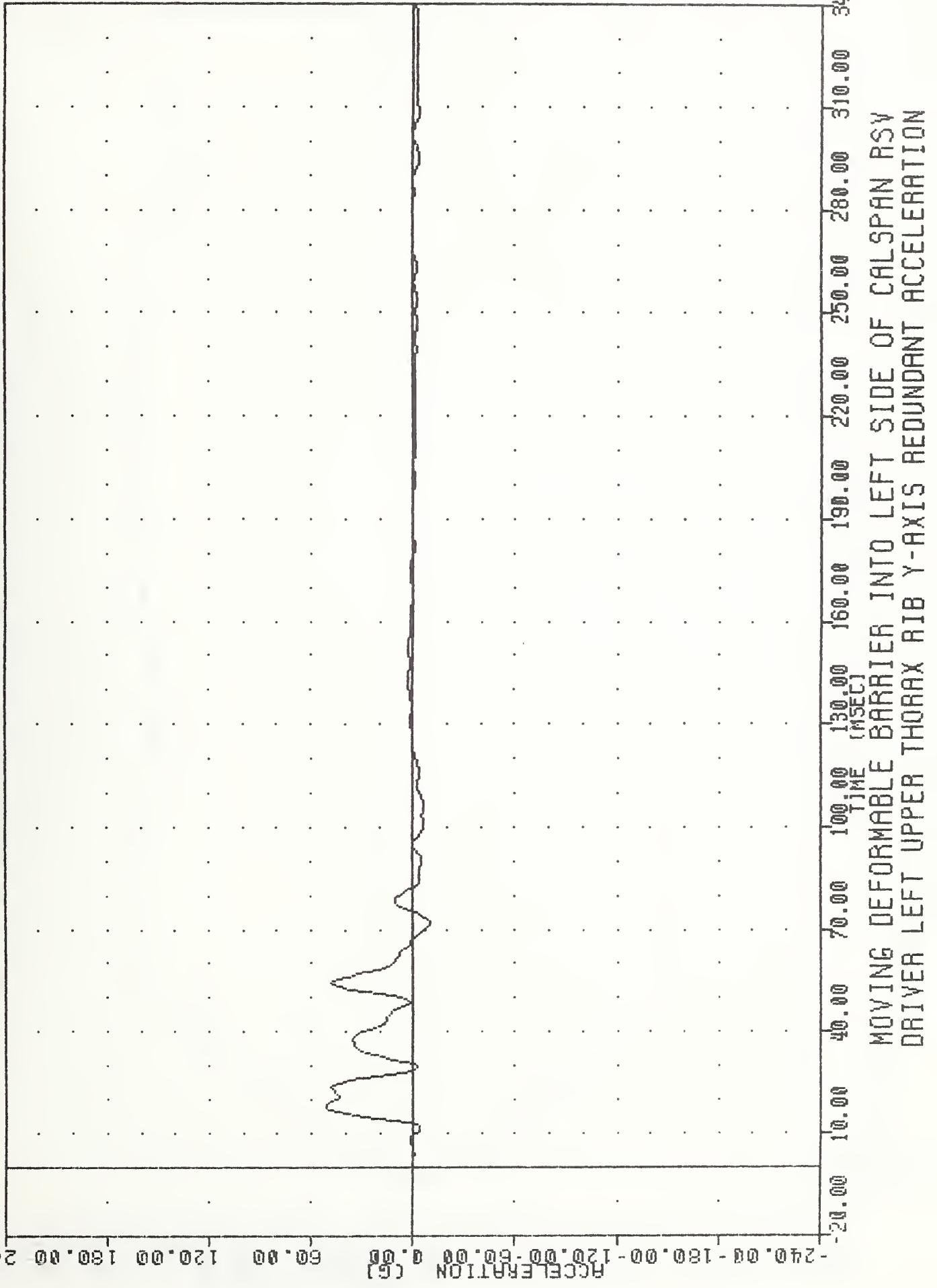
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -10.198 72.500
LURG1 50.47 e 17.50



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
RIBS
LEFT UPPER THORAX RIB X-AXIS ACCELERATION

WRTC 910604
LEFT SIDE IMPACT
91155
LURIGA

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -10.288 71.88 51.58 0 17.50

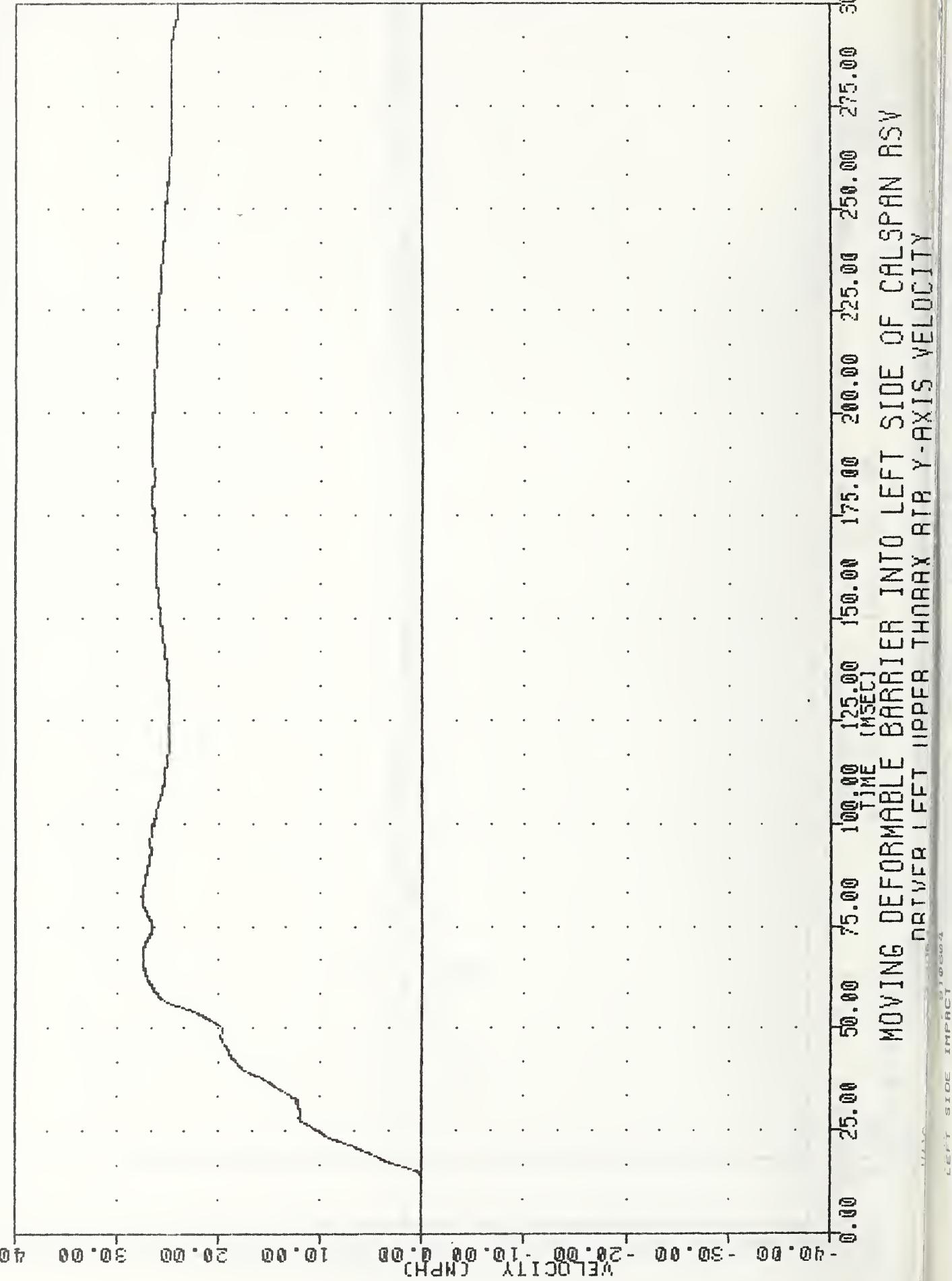


WRTC , 910604
LEFT SIDE IMPACT

1155

FILTER = ALPF MIN. MAX VALUES = -0.028 1650/ 5214/-40

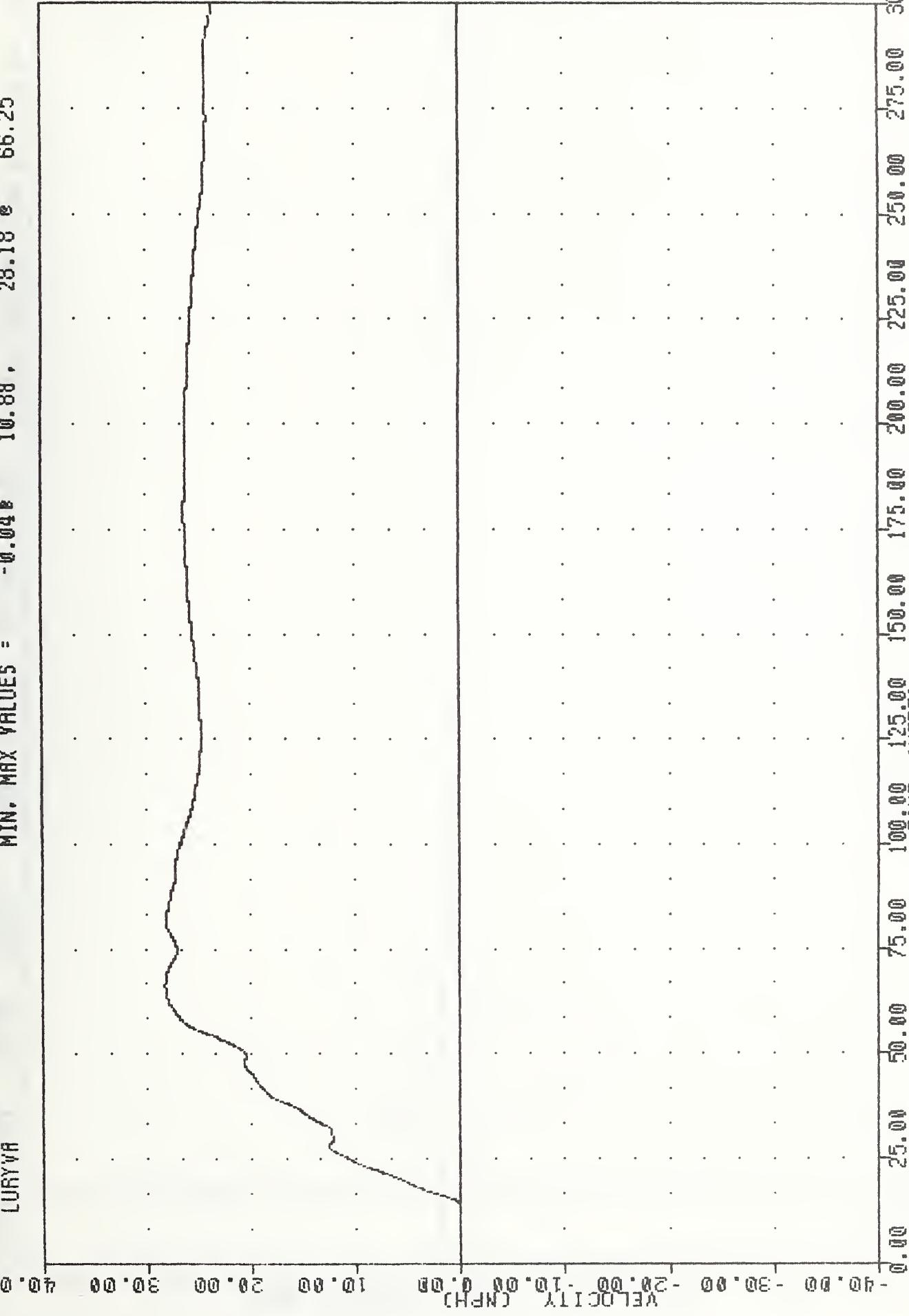
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MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LEFT UPPER THORAX RIB Y-AXIS REDUNDANT VELOCITY

YRTC 910604
LEFT SIDE IMPACT
91155
LURY/R

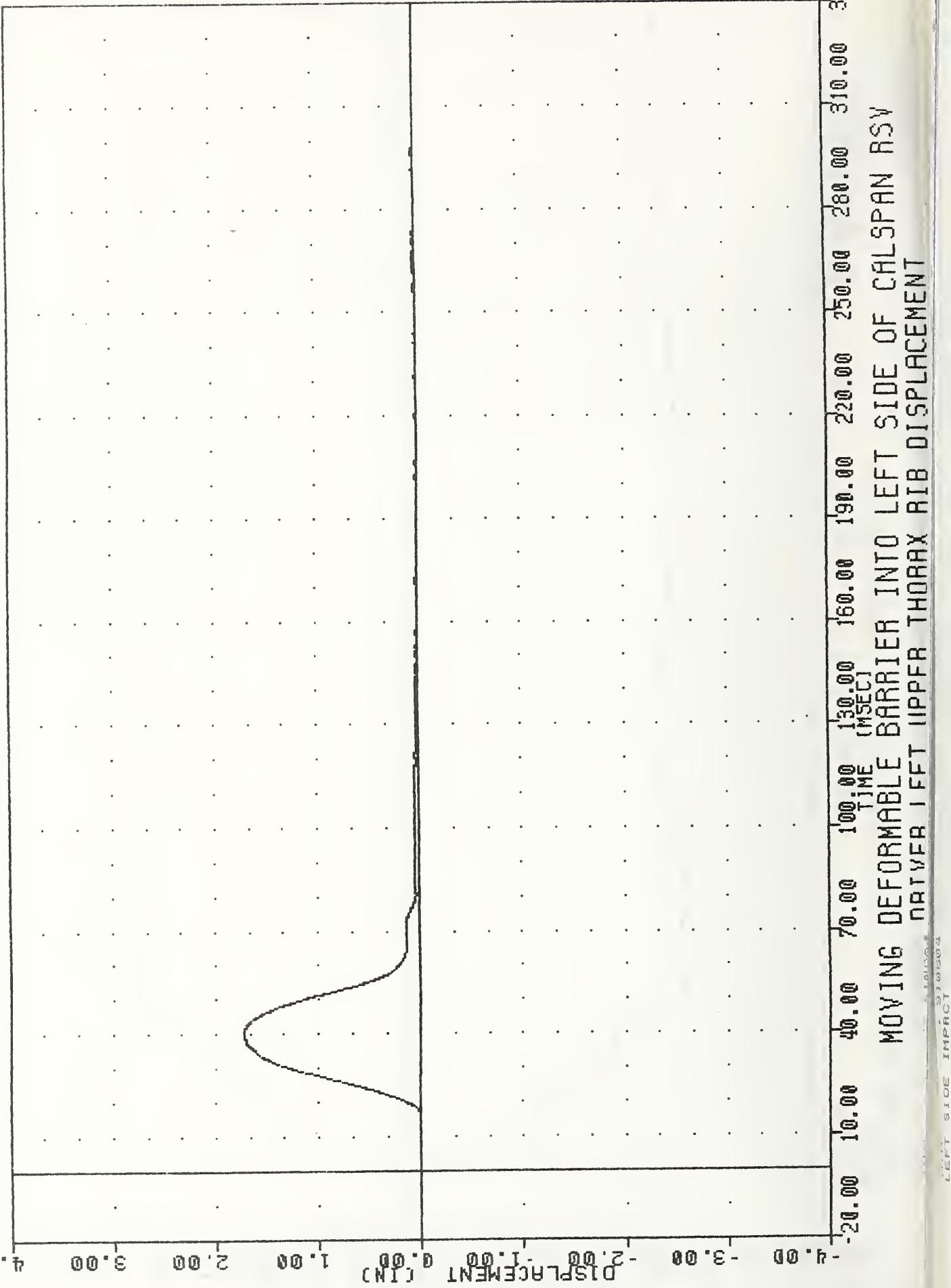
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.048 10.88 , 28.18 @ 66.25



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LEFT UPPER THORAX RIB Y-AXIS REDUNDANT VELOCITY

VRTC 910604
LEFT SIDE IMPACT
91155
LURYD1

FILTER = BLPF 3000/ 949/ -40
MIN. MAX VALUES = 0.00e -10.38 . 1.72 e 40.13

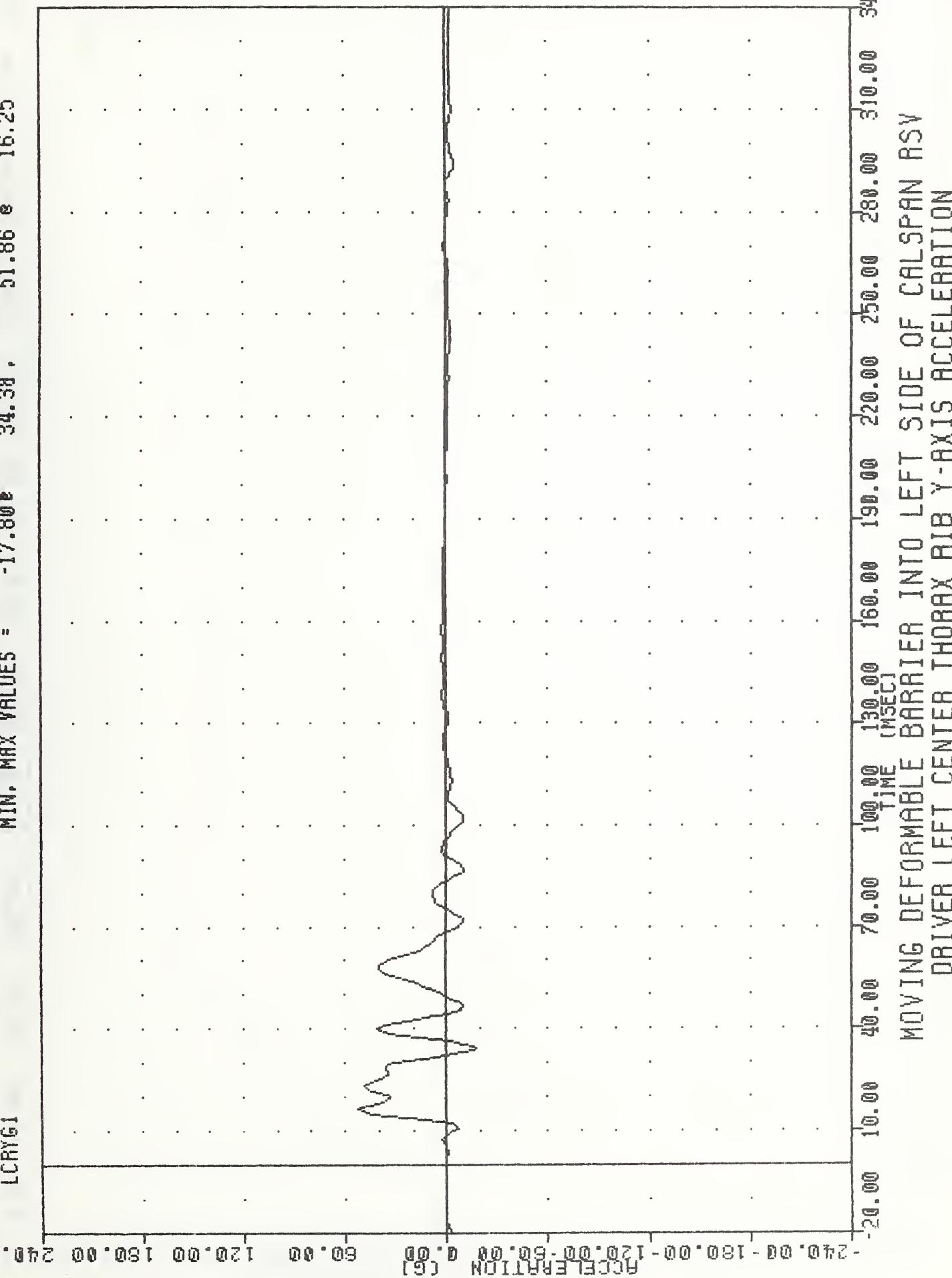


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LEFT CENTER THORAX RIB

VRTC 910604
LEFT SIDE IMPACT

91155
LCRY61

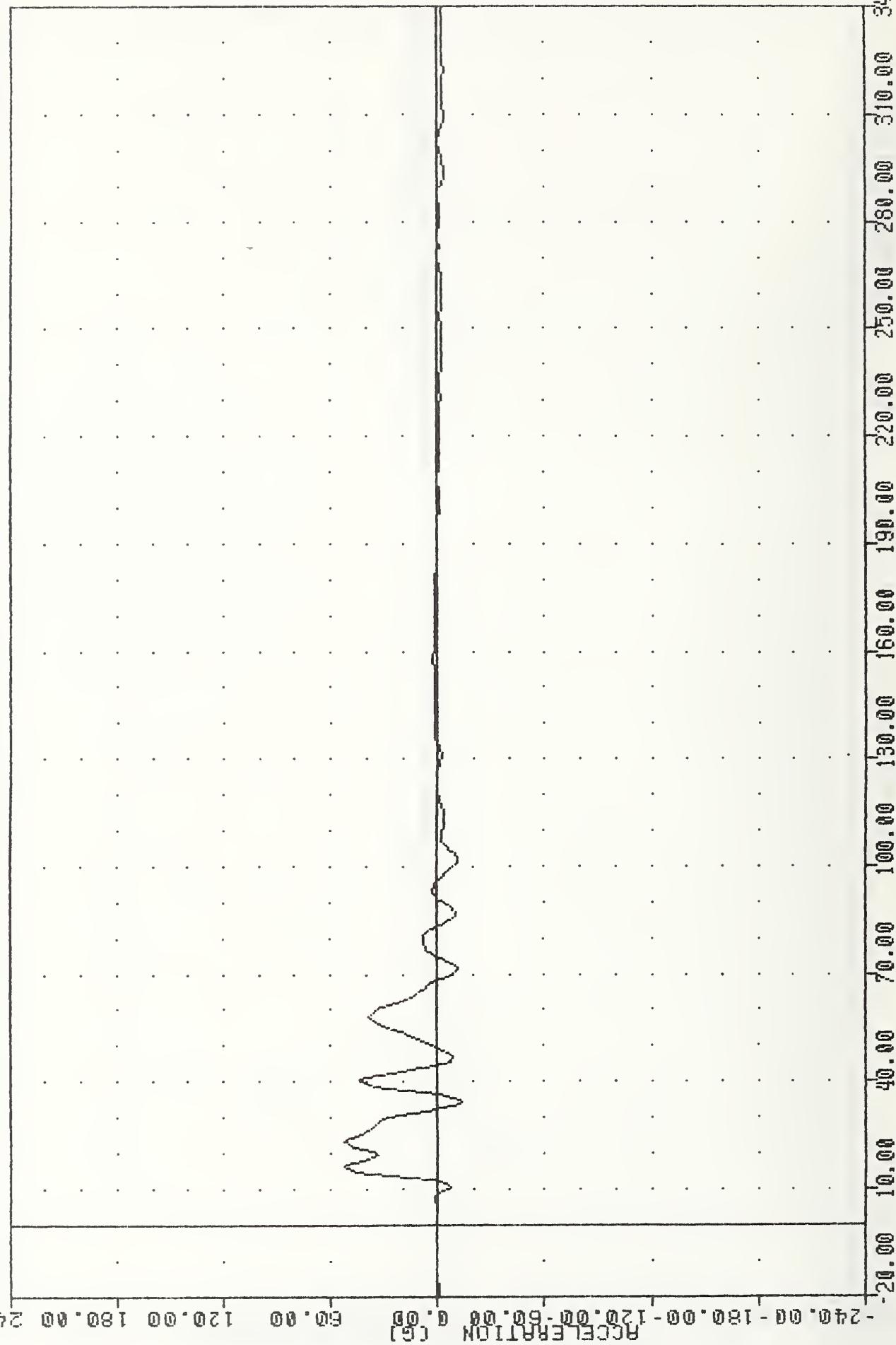
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -17.800 34.38 . 51.86 @ 16.25



WHIL
LEFT SIDE IMPACT

91155
LCRYGA

FILTER = HSPL 136/ 189/ -50
MIN. MAX VALUES = -14.128 34.38 , 53.04 & 16.25



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN ASW
BARRIER LEFT CENTER THORAX RIB Y-AXIS REDUNDANT ACCELERATION

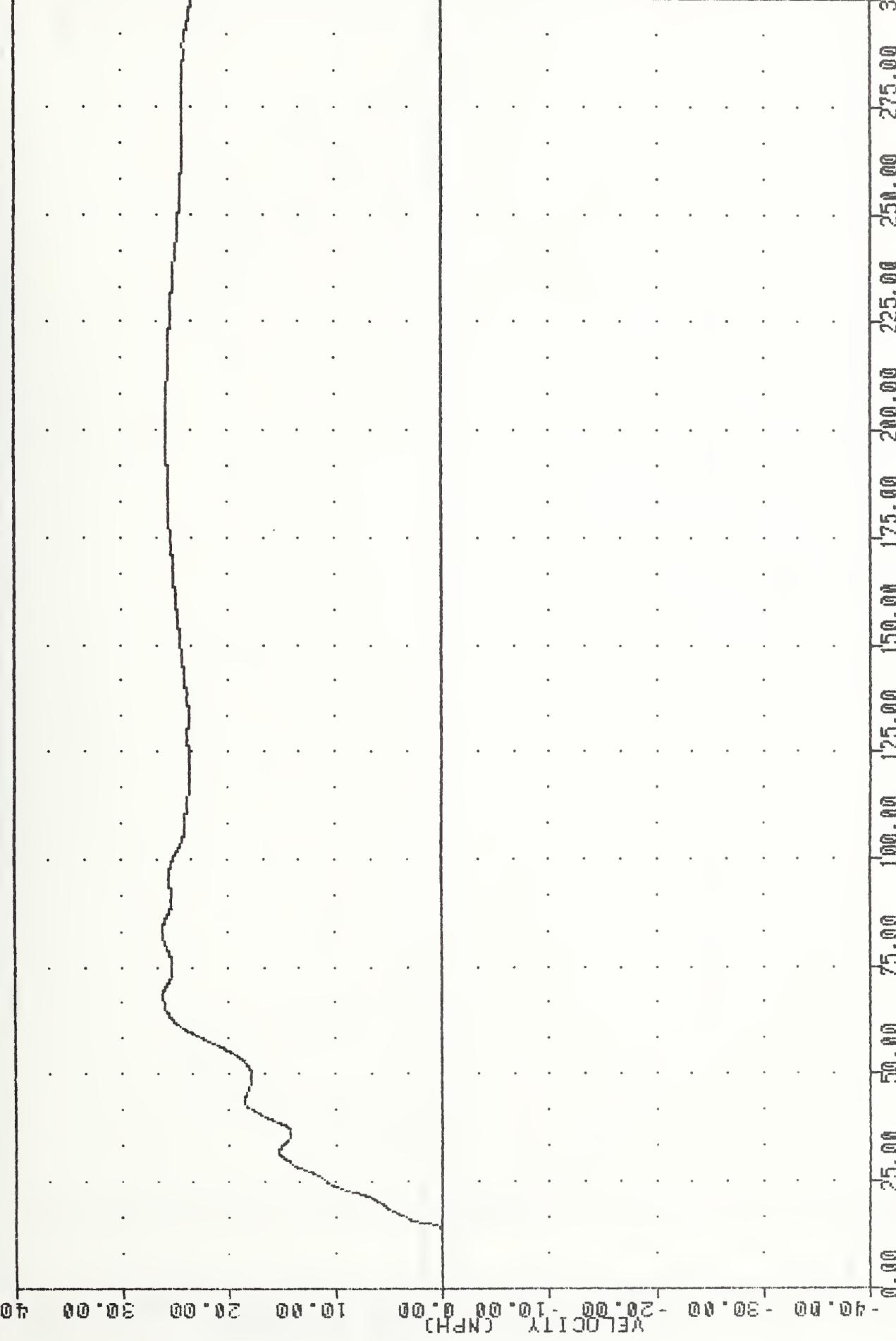
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RIB
DRIVER LEFT CENTER THORAX RIB Y-AXIS REDUNDANT ACCELERATION

VRIC
LEFT SIDE IMPACT
910604

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.018 10.75 . 26.21 e 83.38

LCRY41

0.00



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RIB Y-AXIS VELOCITY
DRIVER LEFT CENTER THORAX RIB Y-AXIS VELOCITY

0.00

25.00

50.00

75.00

100.00

125.00

150.00

175.00

200.00

225.00

250.00

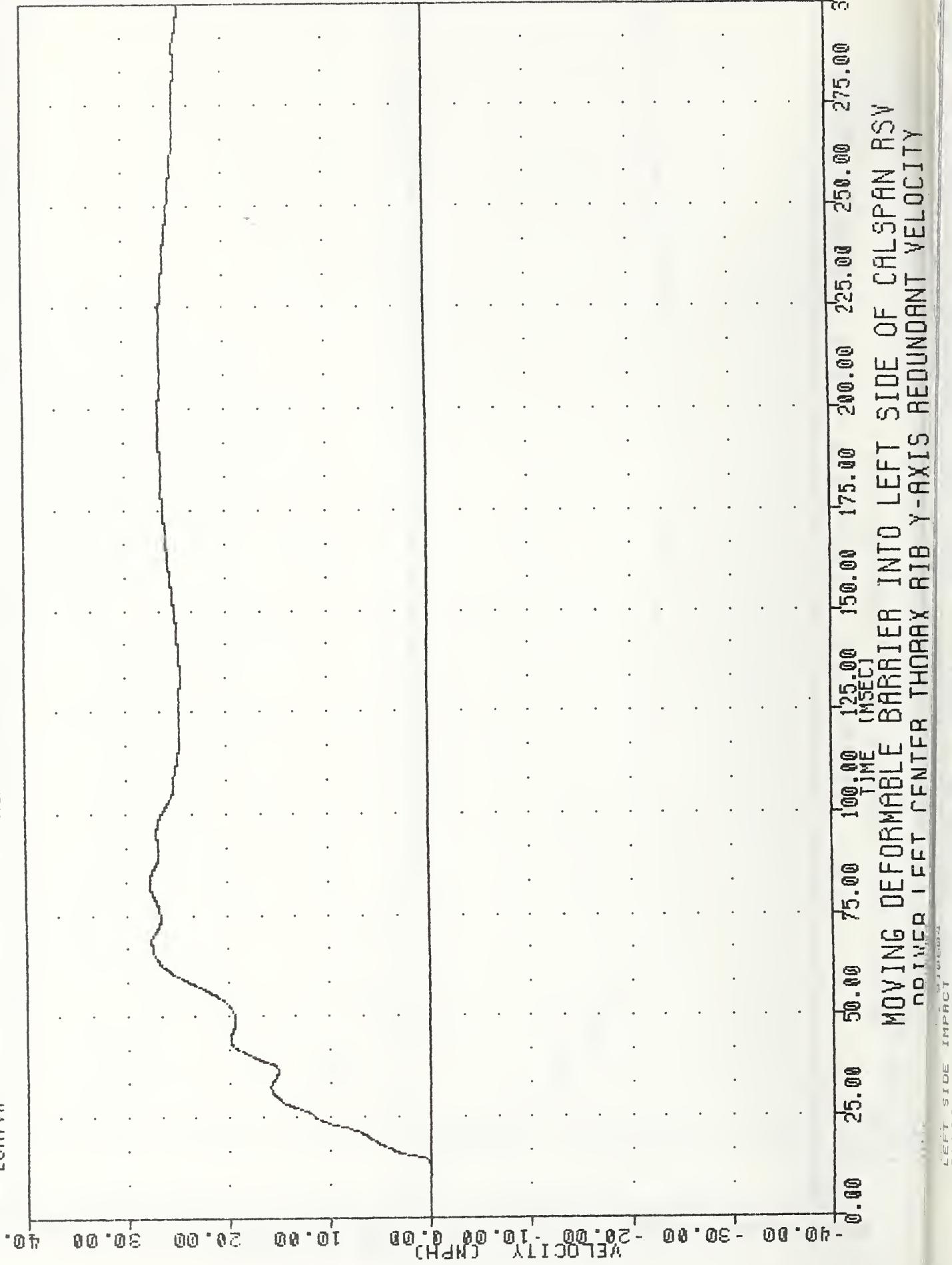
275.00

300.00

0.00

WRTC
LEFT SIDE IMPACT
91155
LCRYVA

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.00 e 0.00 .
27.71 e 63.13



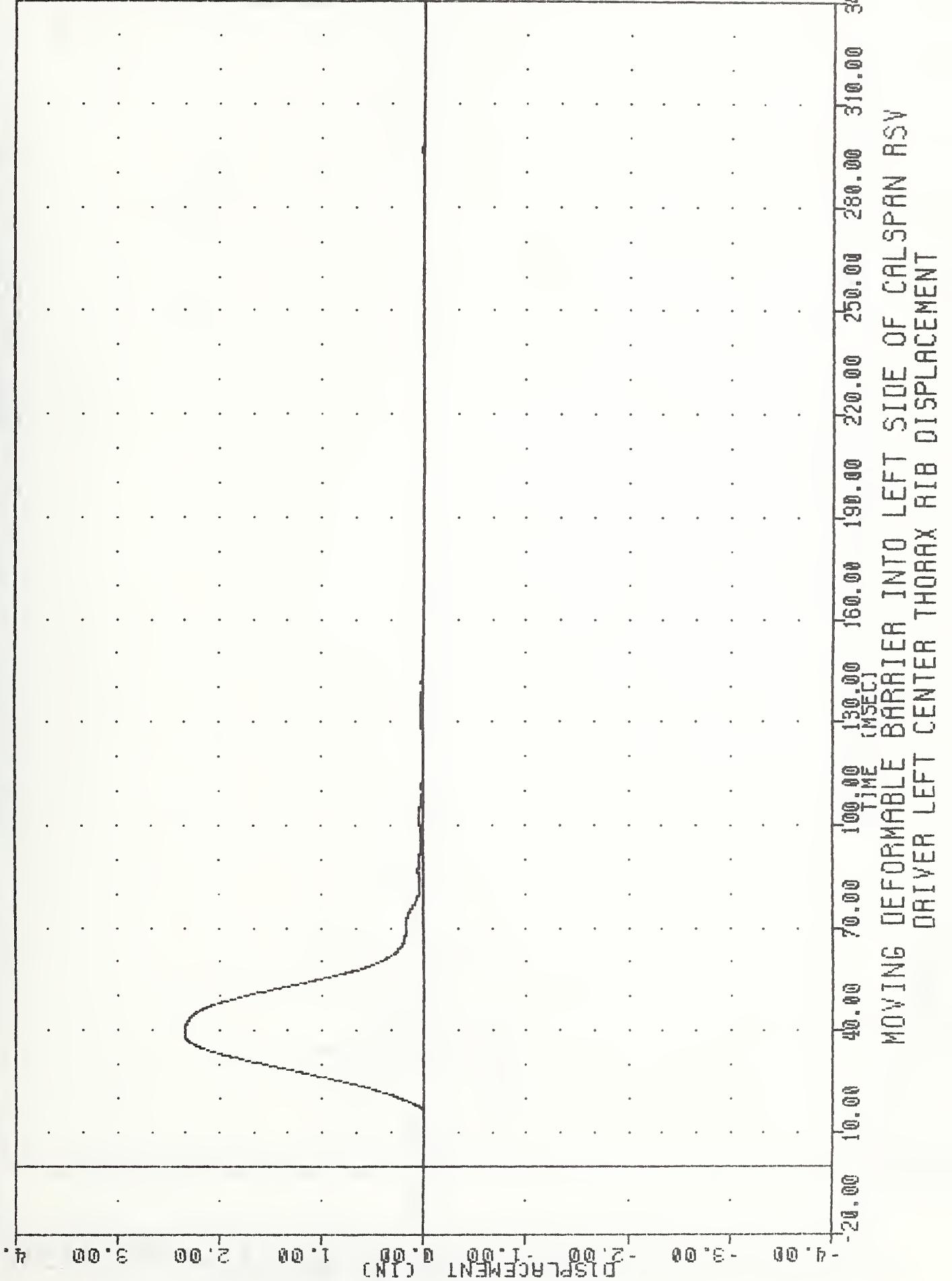
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LEFT CENTER THORAX RIB SPAN RSV

VRTC
'910604

LEFT SIDE IMPACT

91155
LCRY01

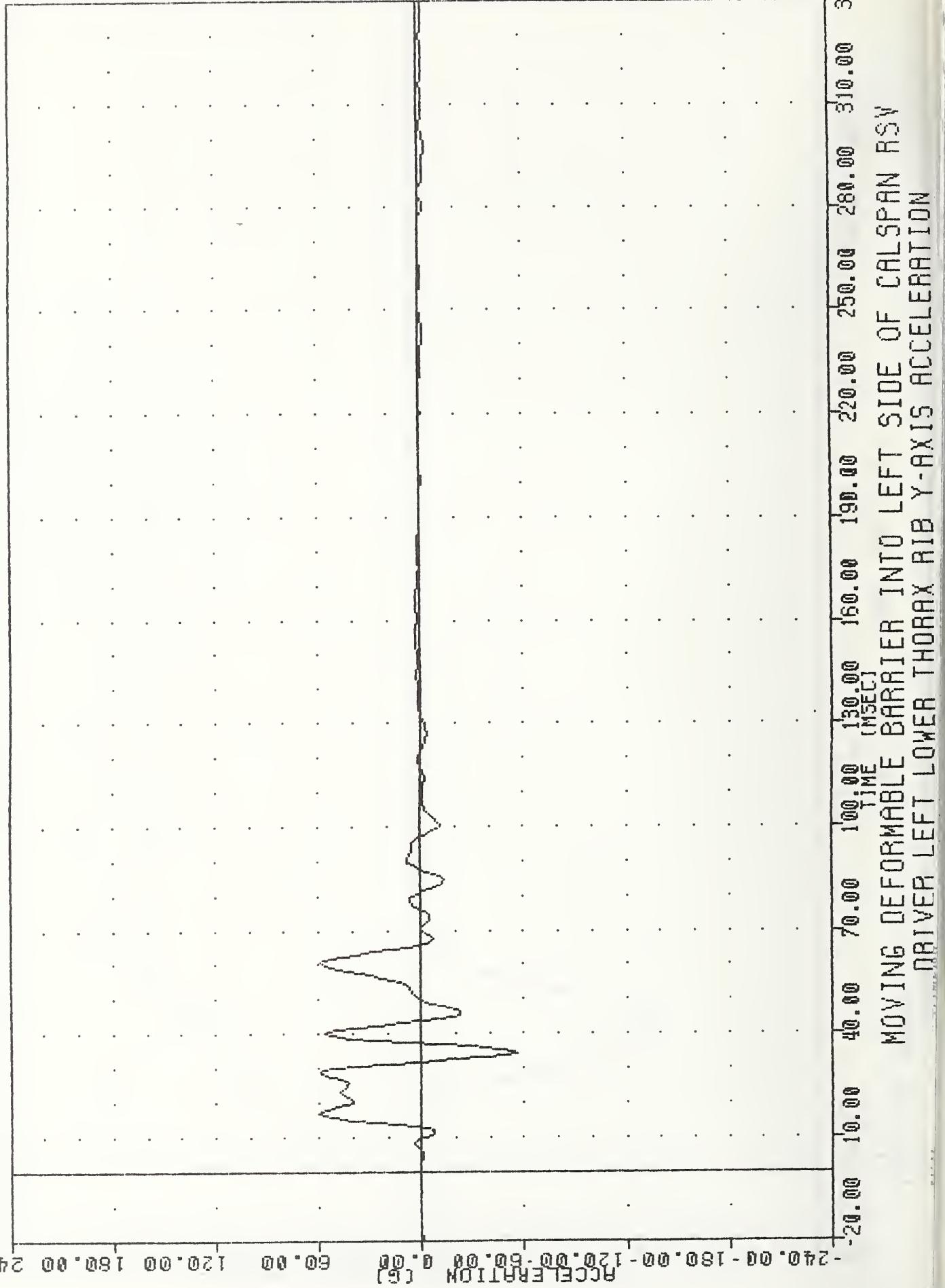
FILTER = BLFF 300/ 949/ -40
MIN, MAX VALUES = 0.00 0 -1.75 . 2.34 2 39.50



VRTC
LEFT SIDE IMPACT
91155

LLRY61

FILTER = HSRL 136/
MIN, MAX VALUES = 189/-50
-55.86 e 34.38 . 60.57 e 16.87



DRIVER LEFT LOWER THORAX RIB Y-AXIS ACCELERATION

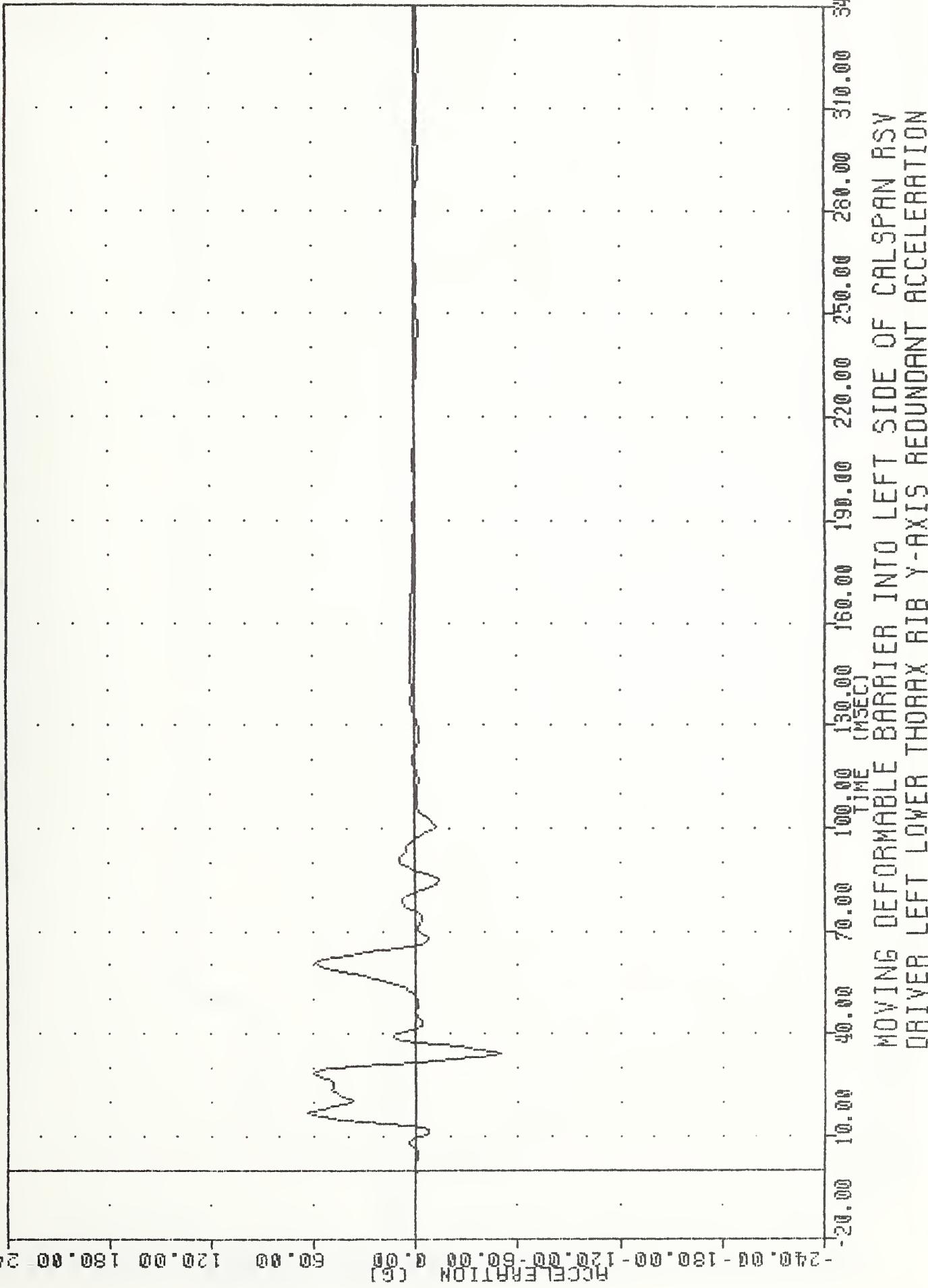
YRTC 910604

LEFT SIDE IMPACT

91155

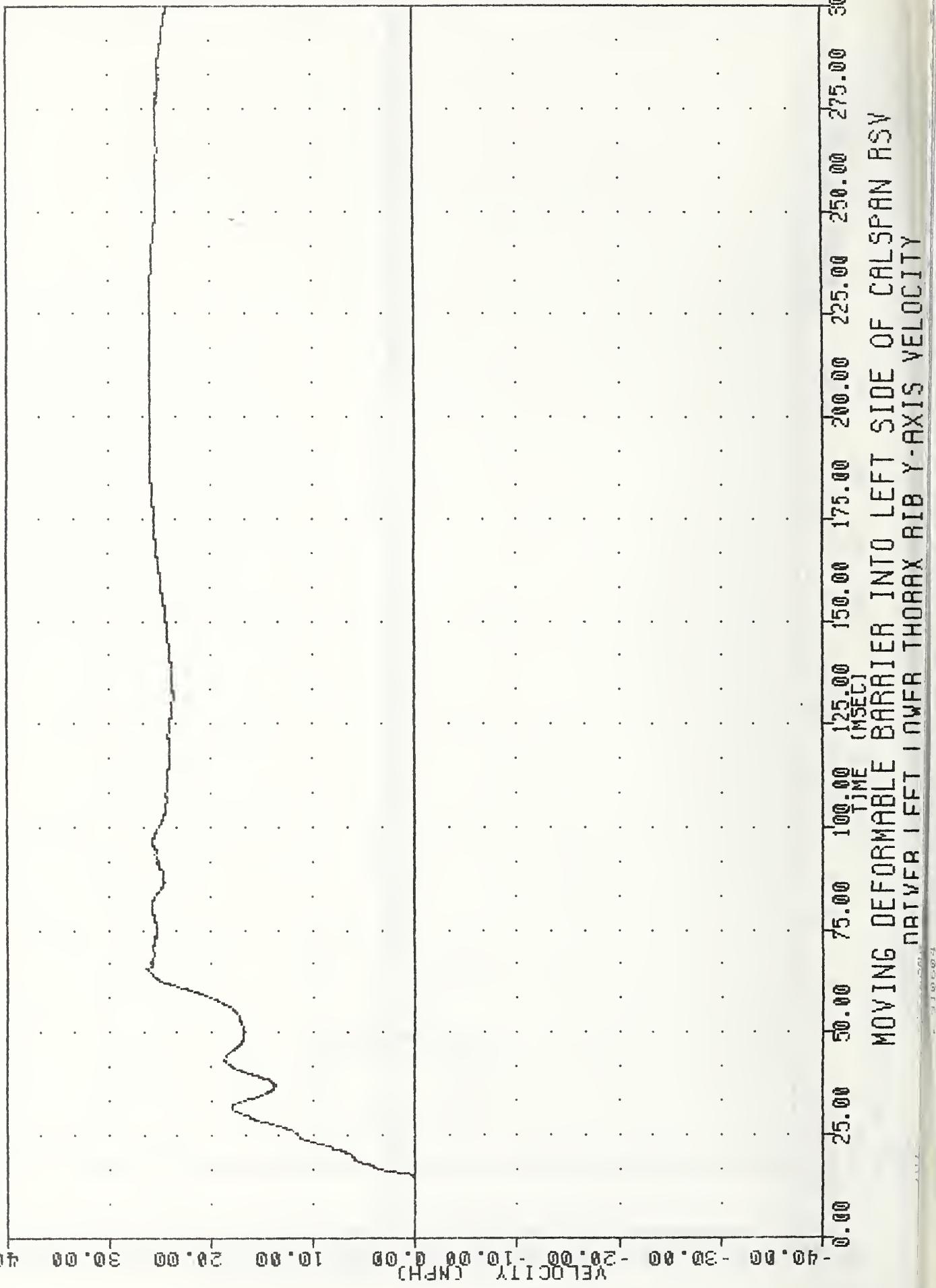
LLRYGA

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -48.69e 34.38 , 63.64 e 16.87



WETIC
LEFT SIDE IMPACT
91155

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.02e 5.89 , 26.26 e 65.63
LLRW1



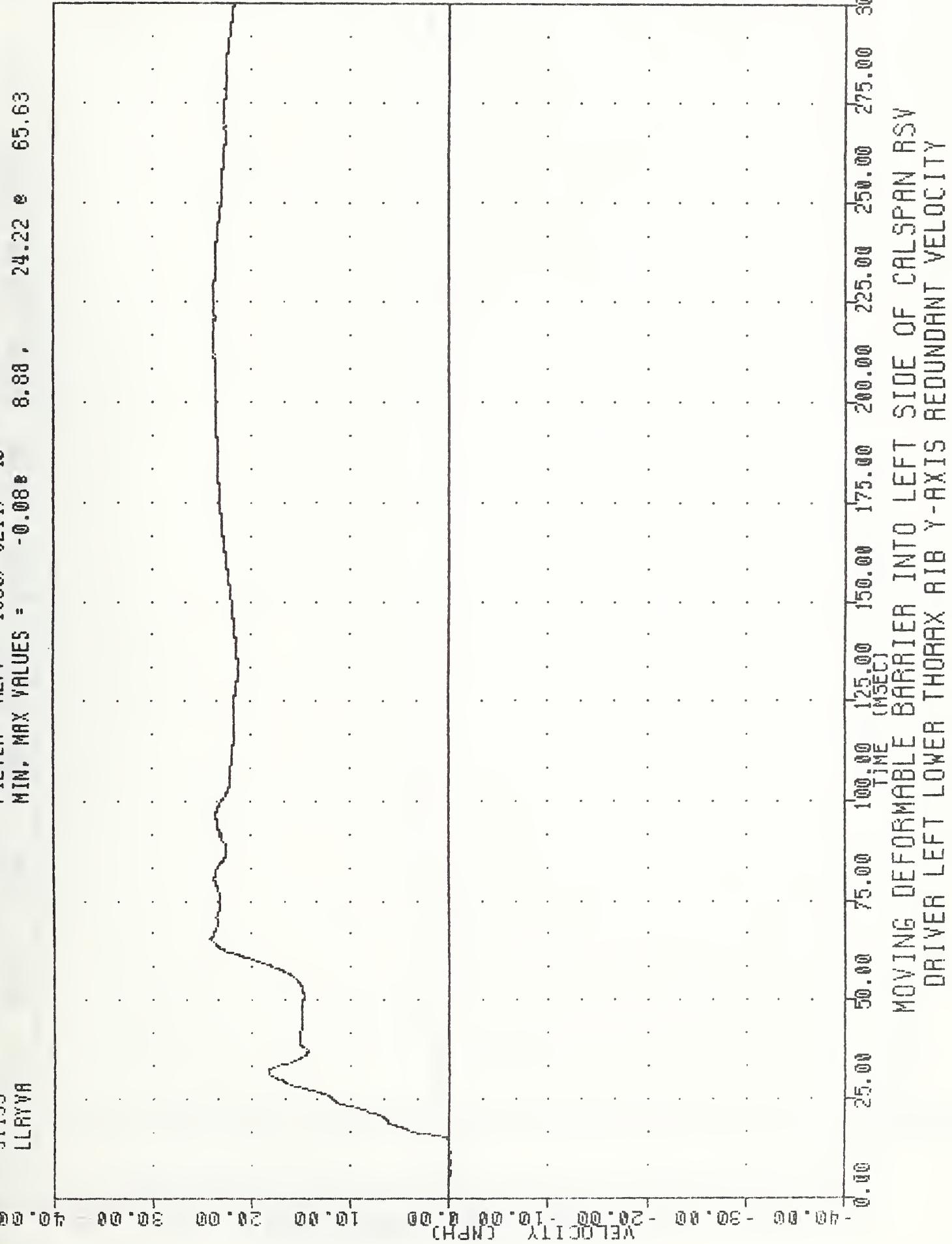
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV

VRTC : 910604

LEFT SIDE IMPACT

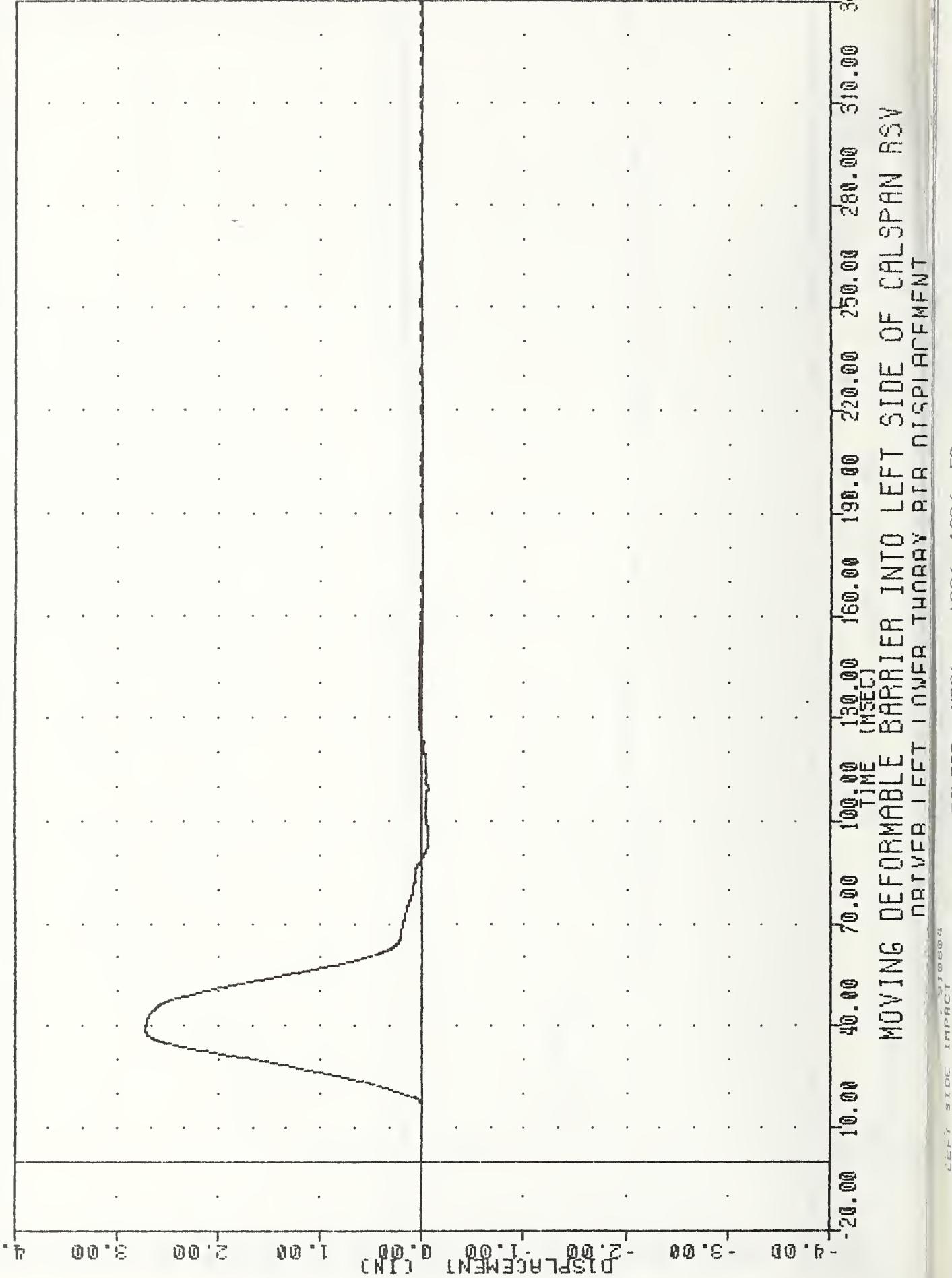
91155
LLRWRA

FILTER = FILPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.088 8.88 . 24.22 e 65.63



VRTC , 910604
LEFT SIDE IMPACT
91155
LLRYD1

FILTER = BLPF 300/ 949/-40
MIN. MAX VALUES = -0.06e 94.63 , 2.72 e 39.00



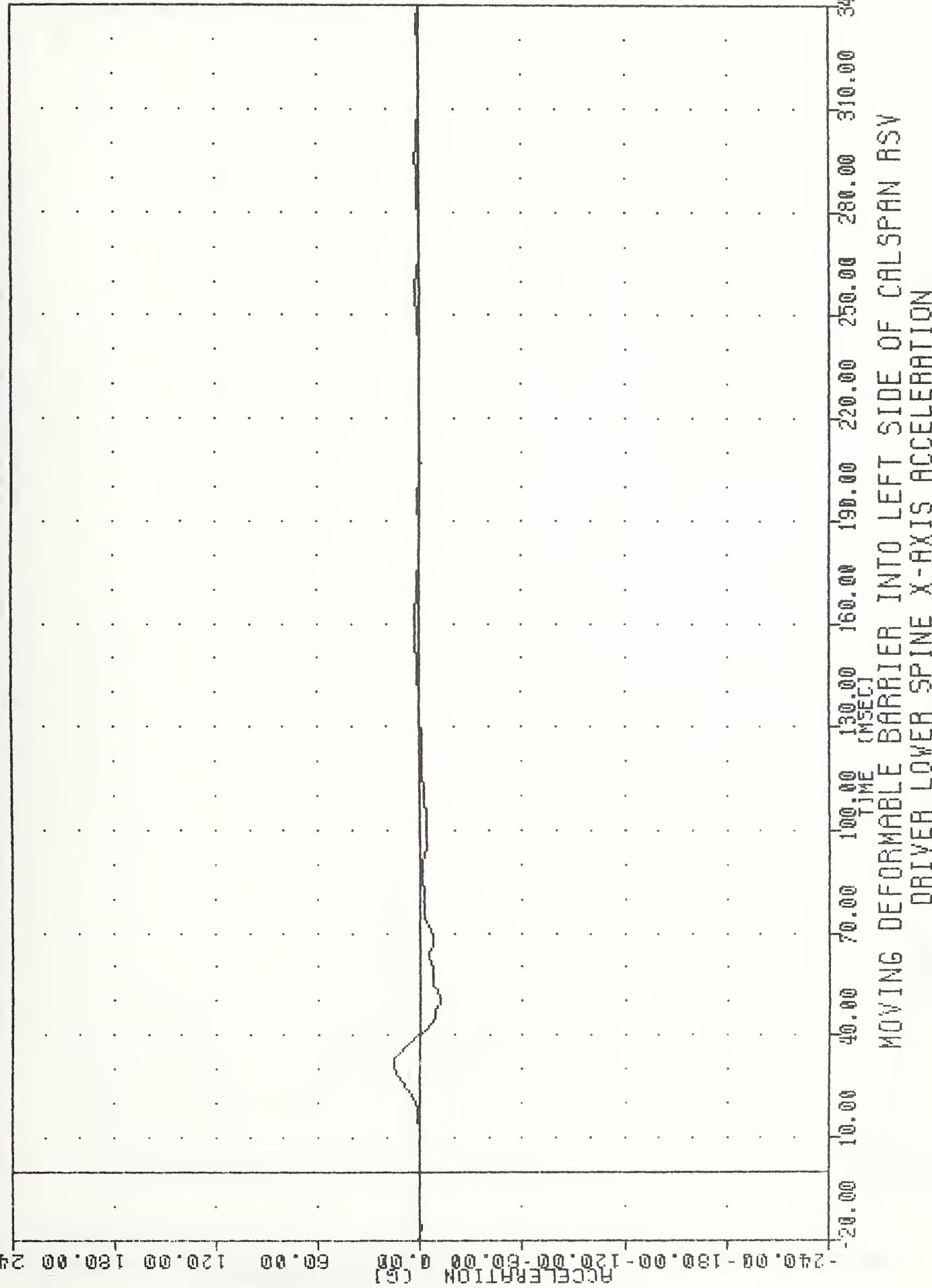
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
ABLYER LEFT BARRIER THROWN

VRTC , 910604

LEFT SIDE IMPACT

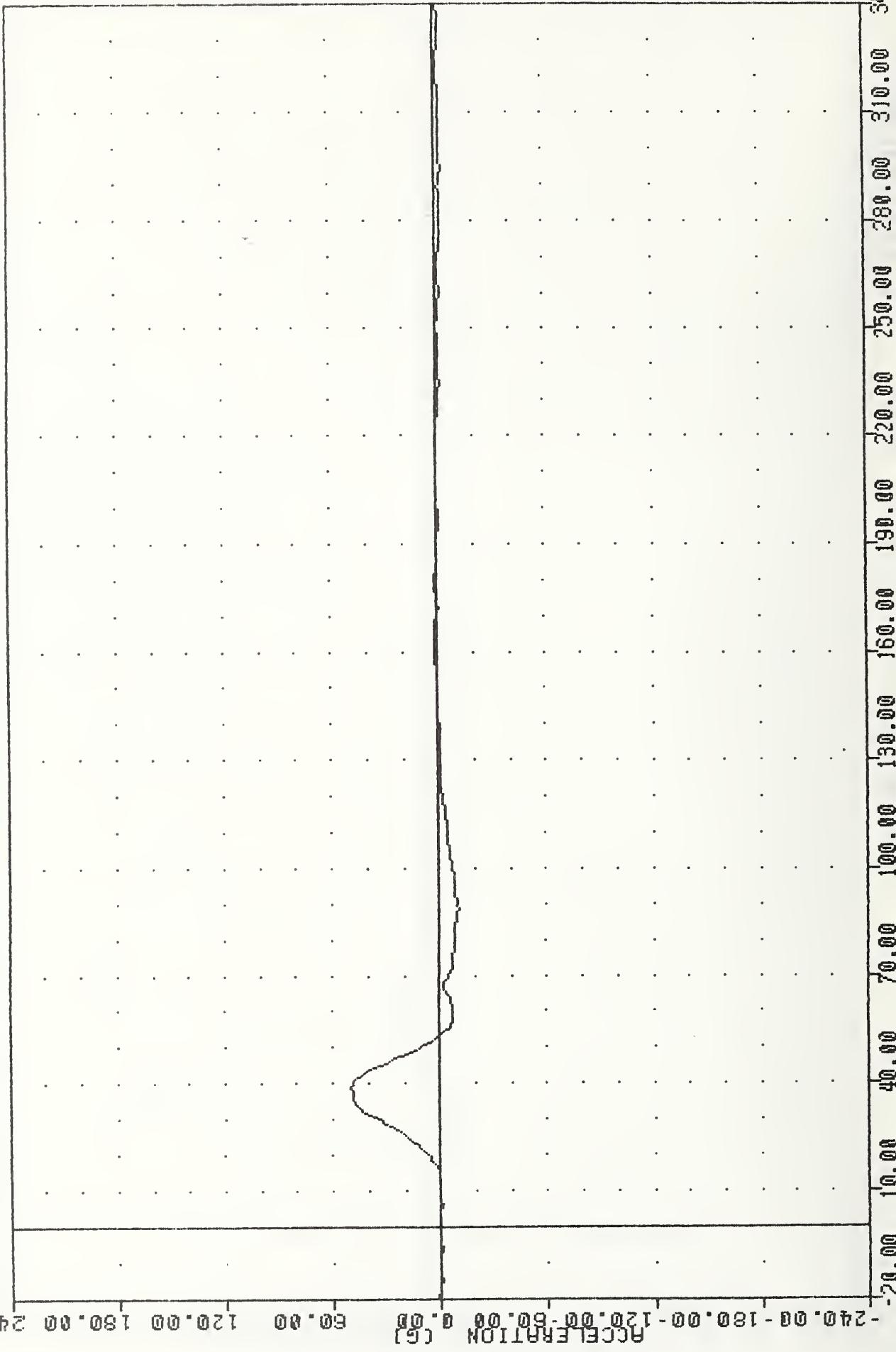
91155
T12XG1

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -11.418 50.63 , 16.04 8 31.88



YRTC : 910604
LEFT SIDE IMPACT
91155
112761

FILTER = HSRL 136/ 189/ -50
MIN. MAX VALUES = -10.53 88.75 , 49.34 0 36.75

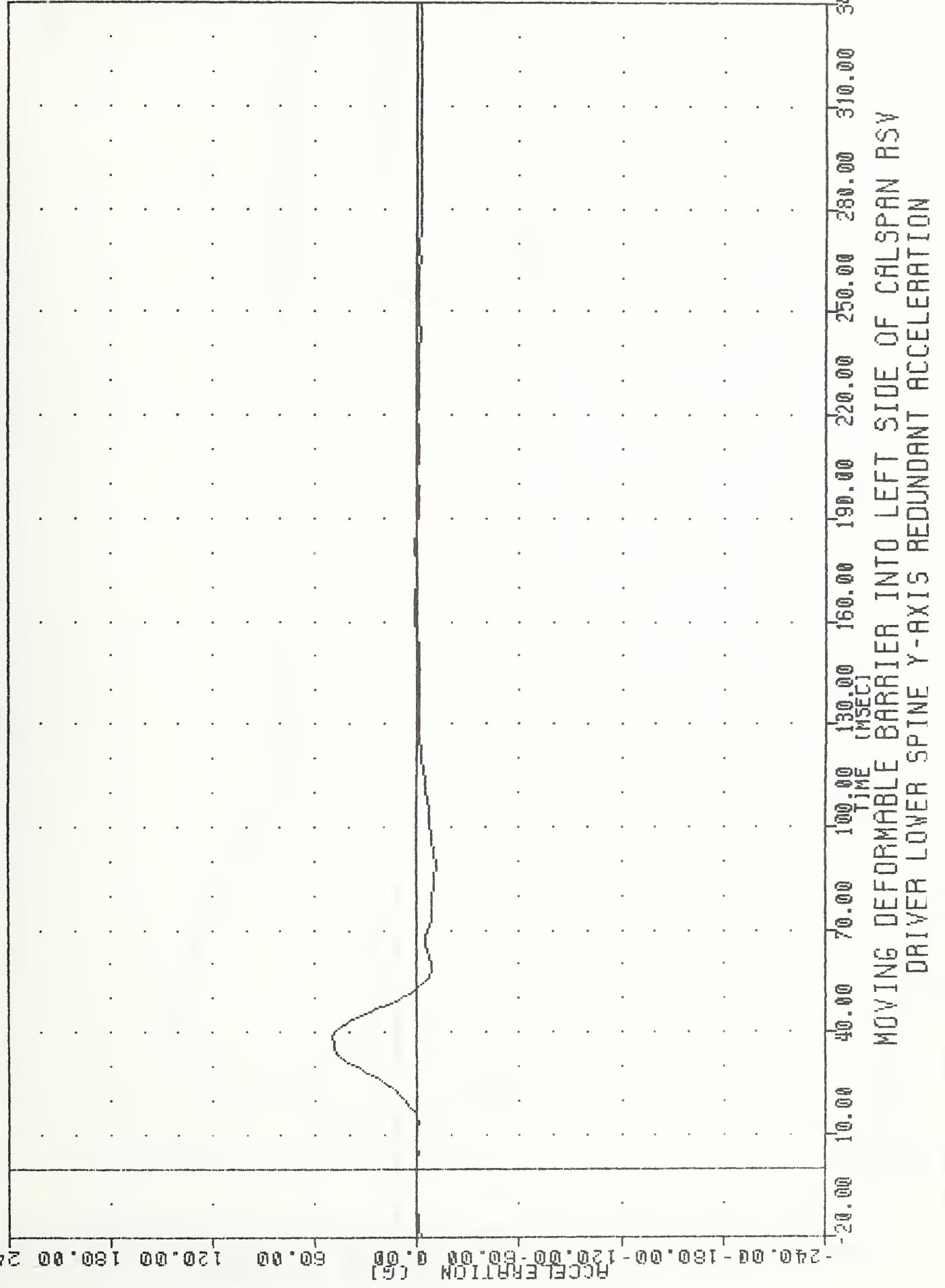


LEFT SIDE IMPACT

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
AFTER LOWER SPINE Y-AXIS ACCELERATION

WTIC 910604
LEFT SIDE IMPACT
91155
11275A

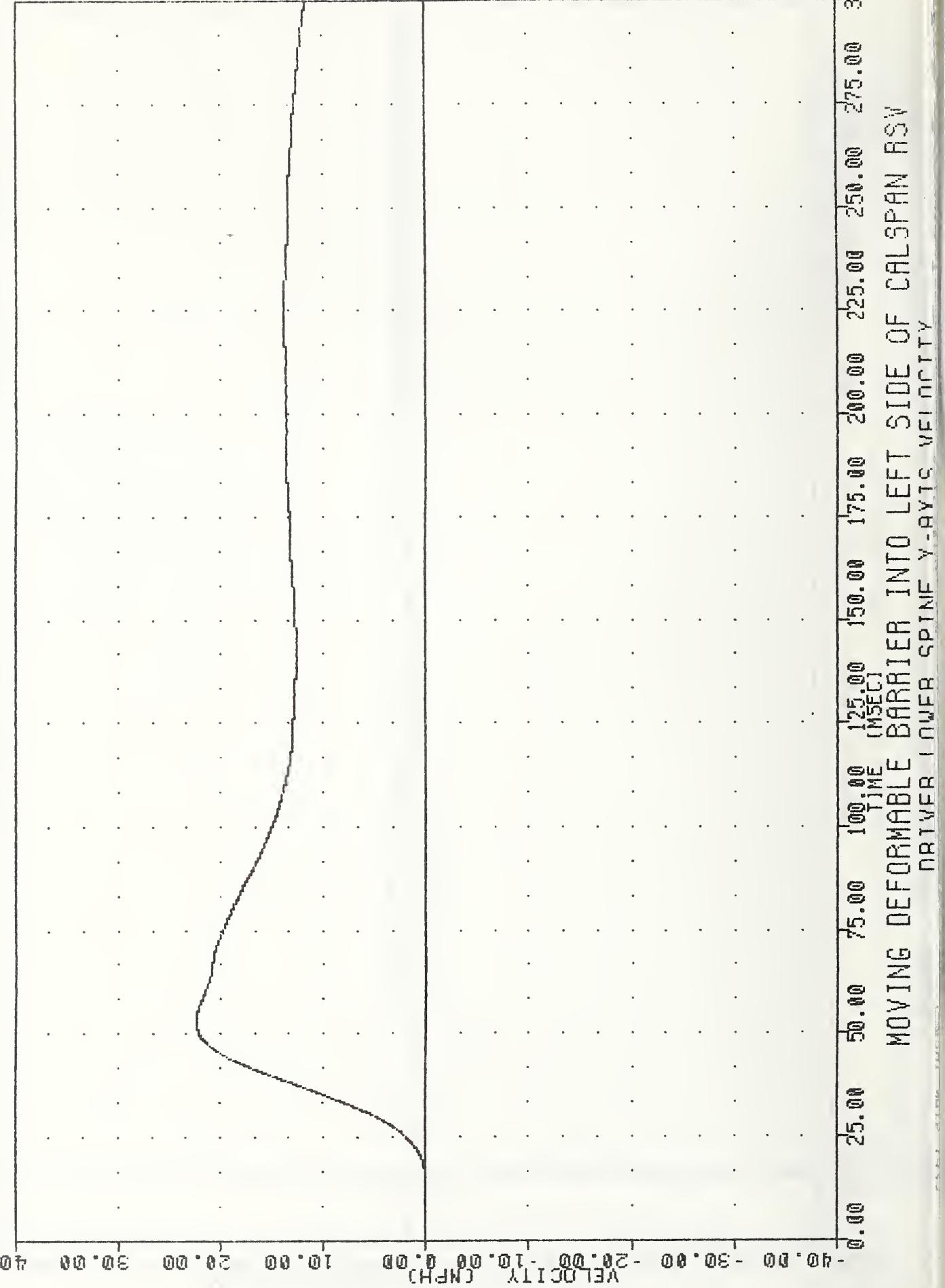
FILTER = HSRI 136/
MIN, MAX VALUES = -10.80 89.38 , 49.42 6 38.75



VRTC
LEFT SIDE IMPACT
91155
T12W1

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.00 e 0.00 .

22.36 e 53.88

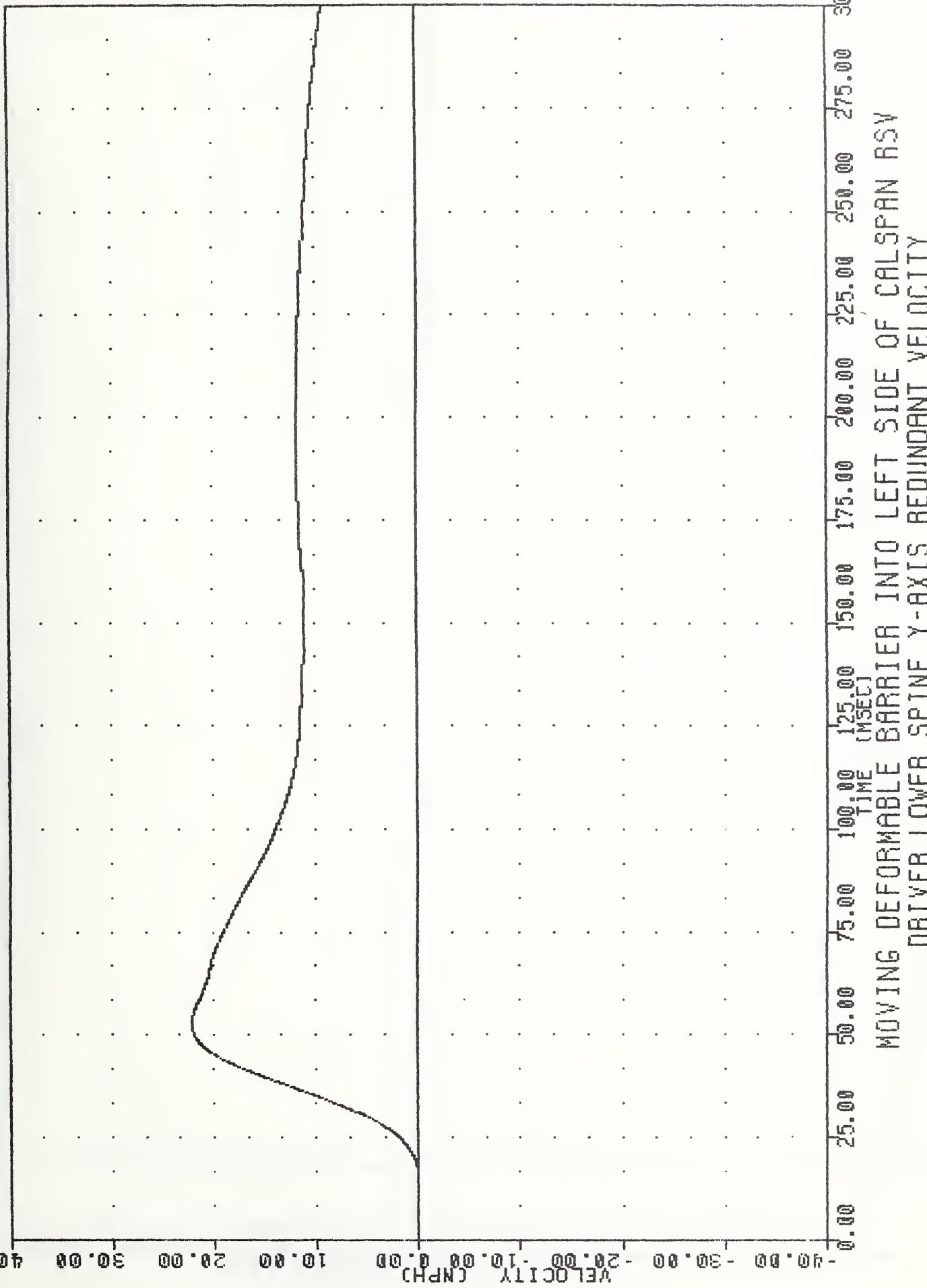


MOVING DEFORMABLE BARRIER SPINE INTO LEFT SIDE OF CALSPAN RSV

LEFT SIDE IMPACT

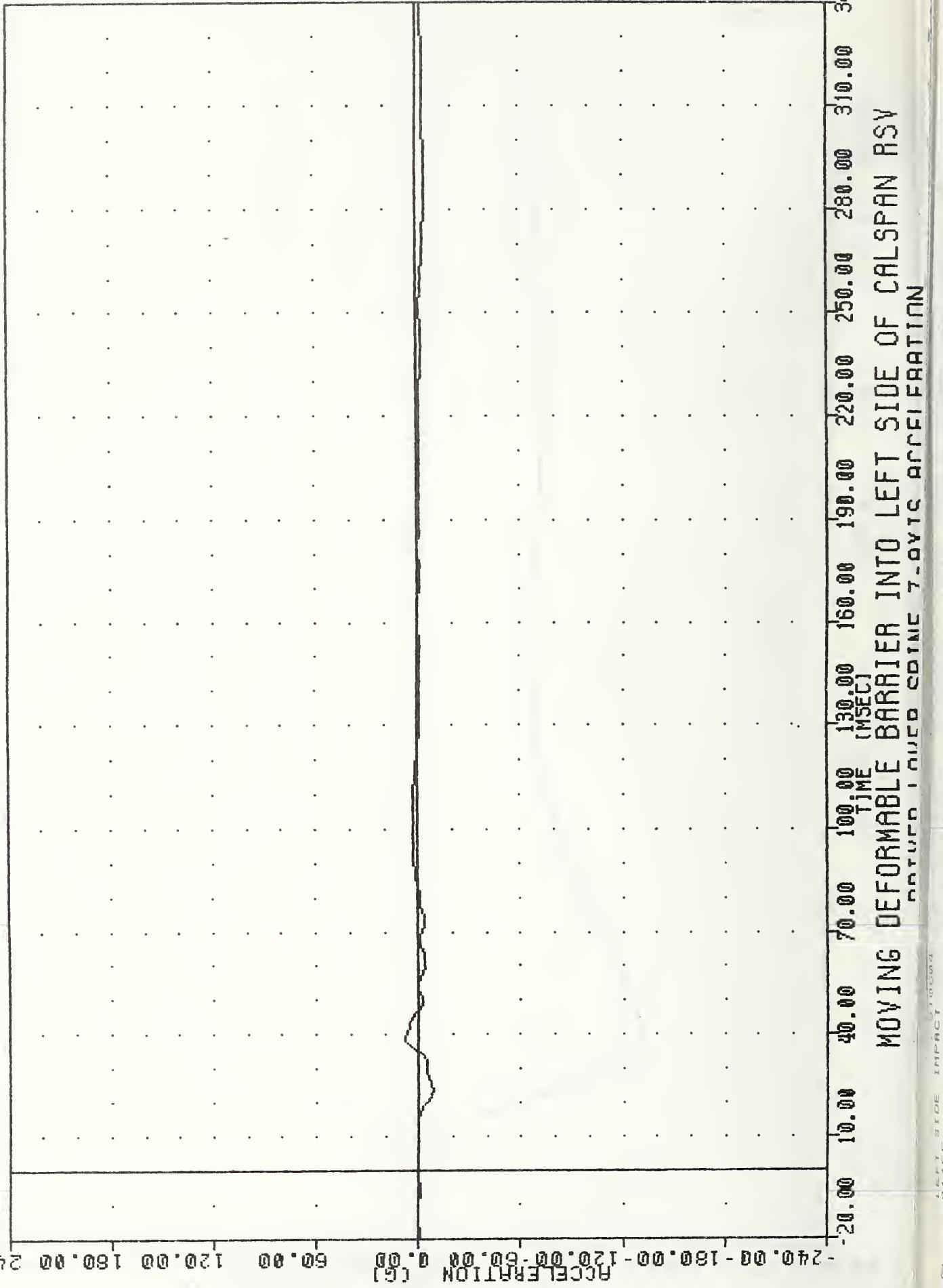
91155
112YR

FILTER = ALPF 1650/
MIN. MAX VALUES = -0.01e - 6.25 . 22.10 e 52.75



910604
LEFT SIDE IMPACT
91155
T12Z61

136/ 189/ -50
FILTER = HSRI
MIN. MAX VALUES = -8.11@ 23.75 , 7.91 @ 38.75

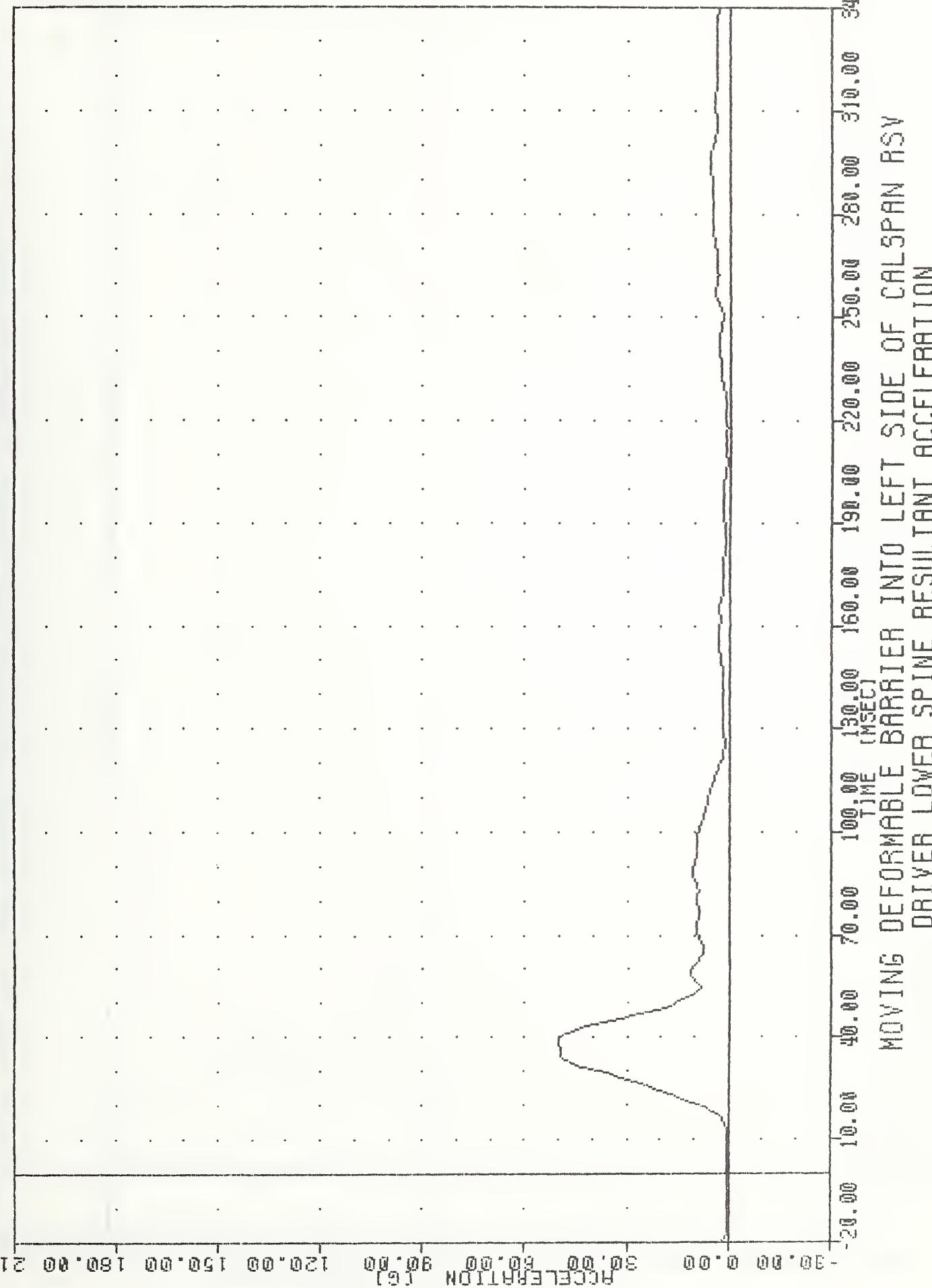


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LOWER SPINE ACCELERATION

YATC 910604
LEFT SIDE IMPACT

91155
T12R61

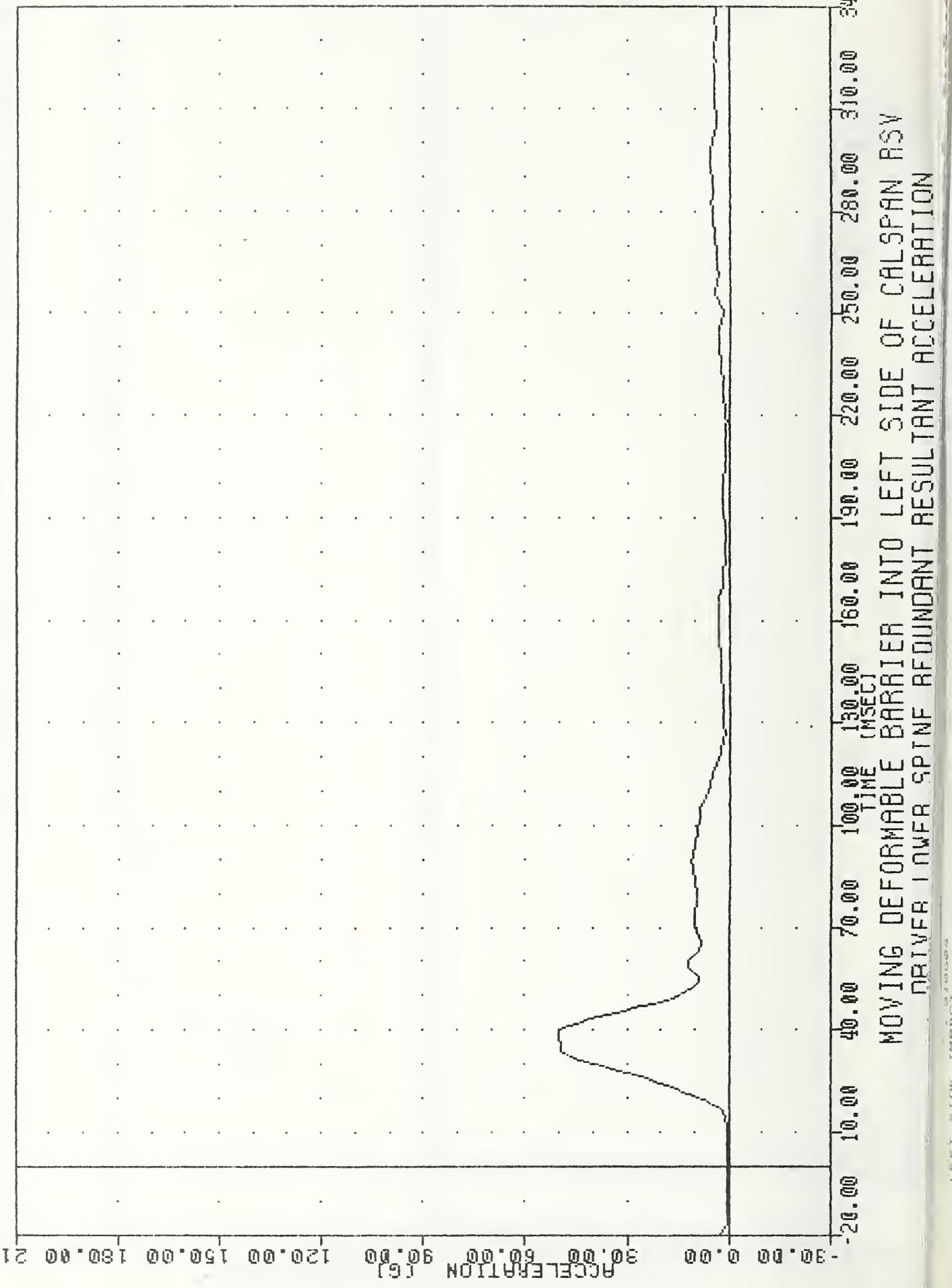
FILTER = HSRI 136/
MIN, MAX VALUES = 0.148 -13.13 , 50.11 & 38.75



VRTC
LEFT SIDE IMPACT

91155
T12R6A

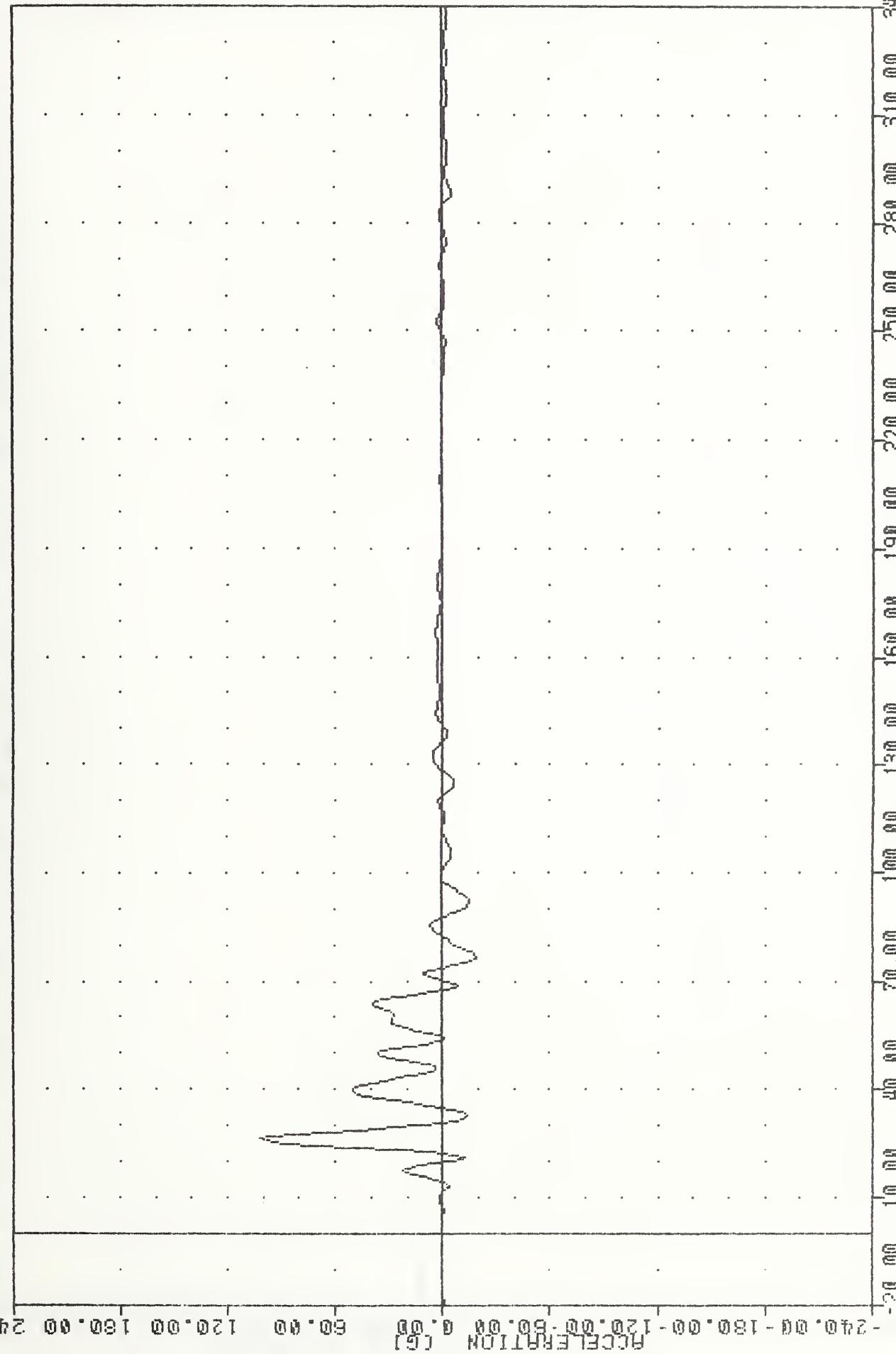
FILTER = HSRL 136/
MIN. MAX VALUES = 0.19@ -1.25@
38.13



VRTC
LEFT SIDE IMPACT

91155
LUAY1

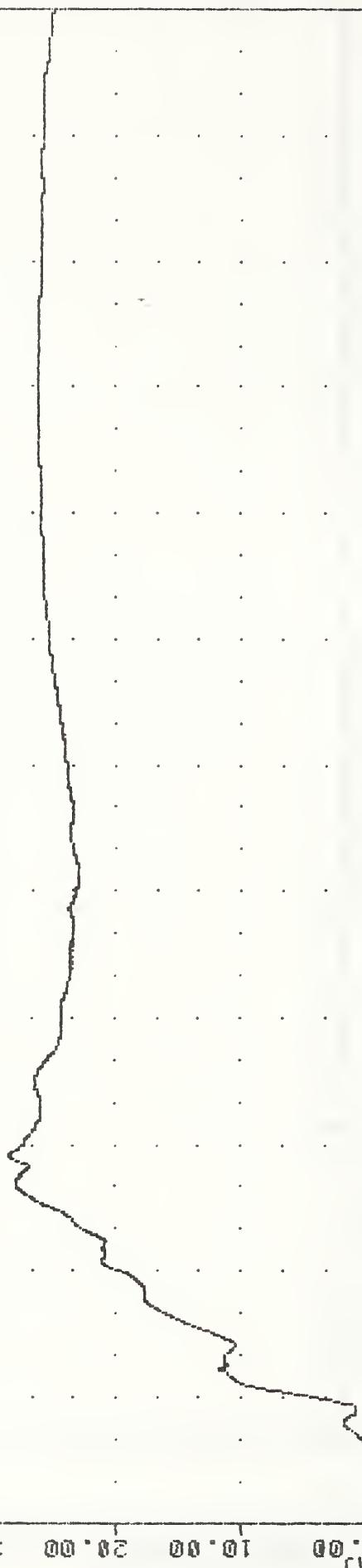
FILTER = HSRII 136/ 189/ -50
MIN, MAX VALUES = -19.288 76.88 , 101.93 & 26.25



TIME (msec)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN ASV
DRIVER LEFT UPPER ABDOMEN RIB Y-AXIS ACCELERATION

WRTG
LEFT SIDE IMPACT
91155
LURAY1

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.082 8.75 , 28.49 & 72.88

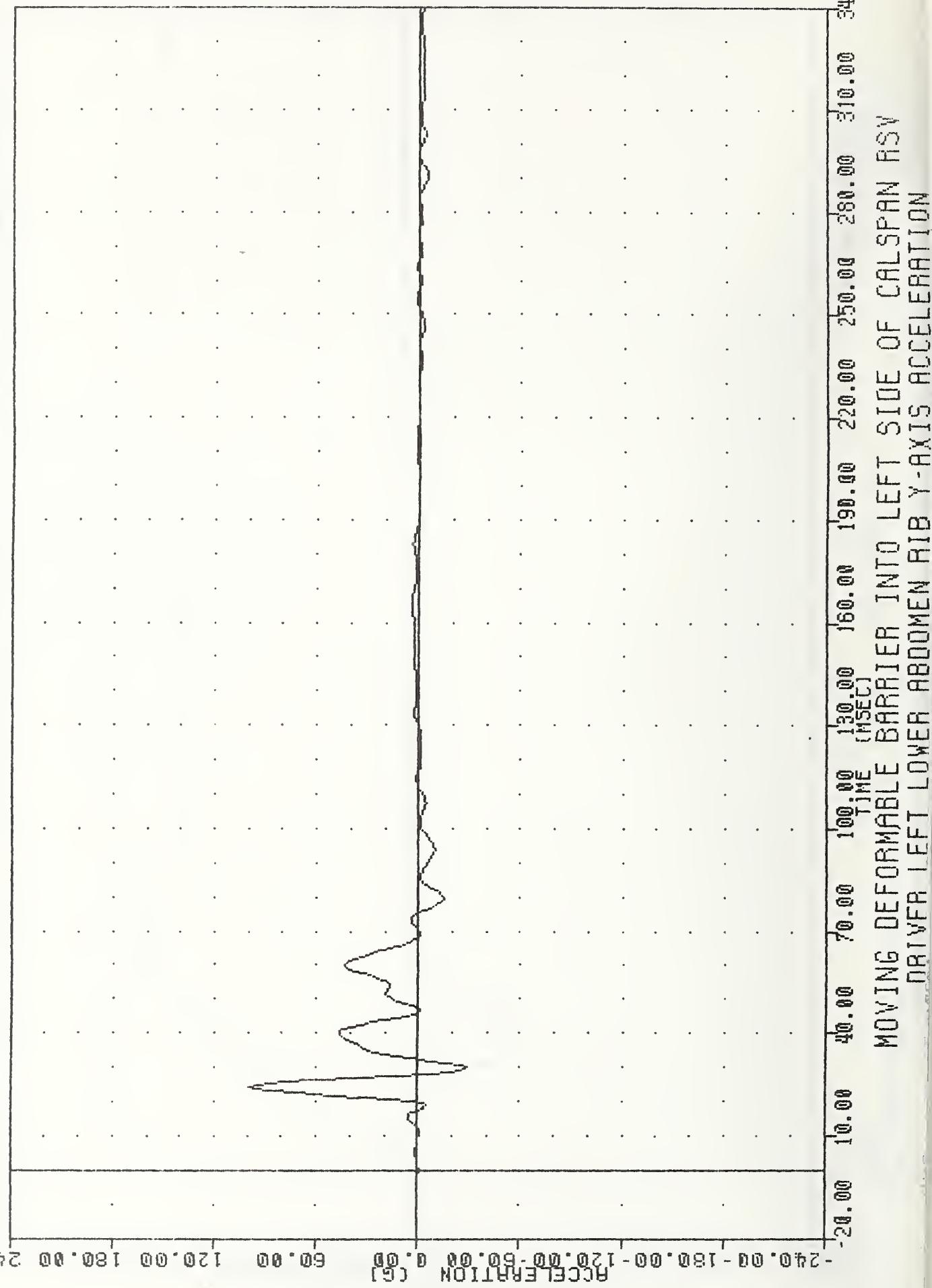


0.00 25.00 50.00 75.00 100.00 125.00 150.00 175.00 200.00 225.00 250.00 275.00 300.00
0.00 25.00 50.00 75.00 100.00 125.00 150.00 175.00 200.00 225.00 250.00 275.00 300.00
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
BARRIER IFET BARRIER ARRANGED RIR Y-AXIS VELOCITY
LEFT SIDE IMPACT

VRTC
LEFT SIDE IMPACT

31155
LLAY61

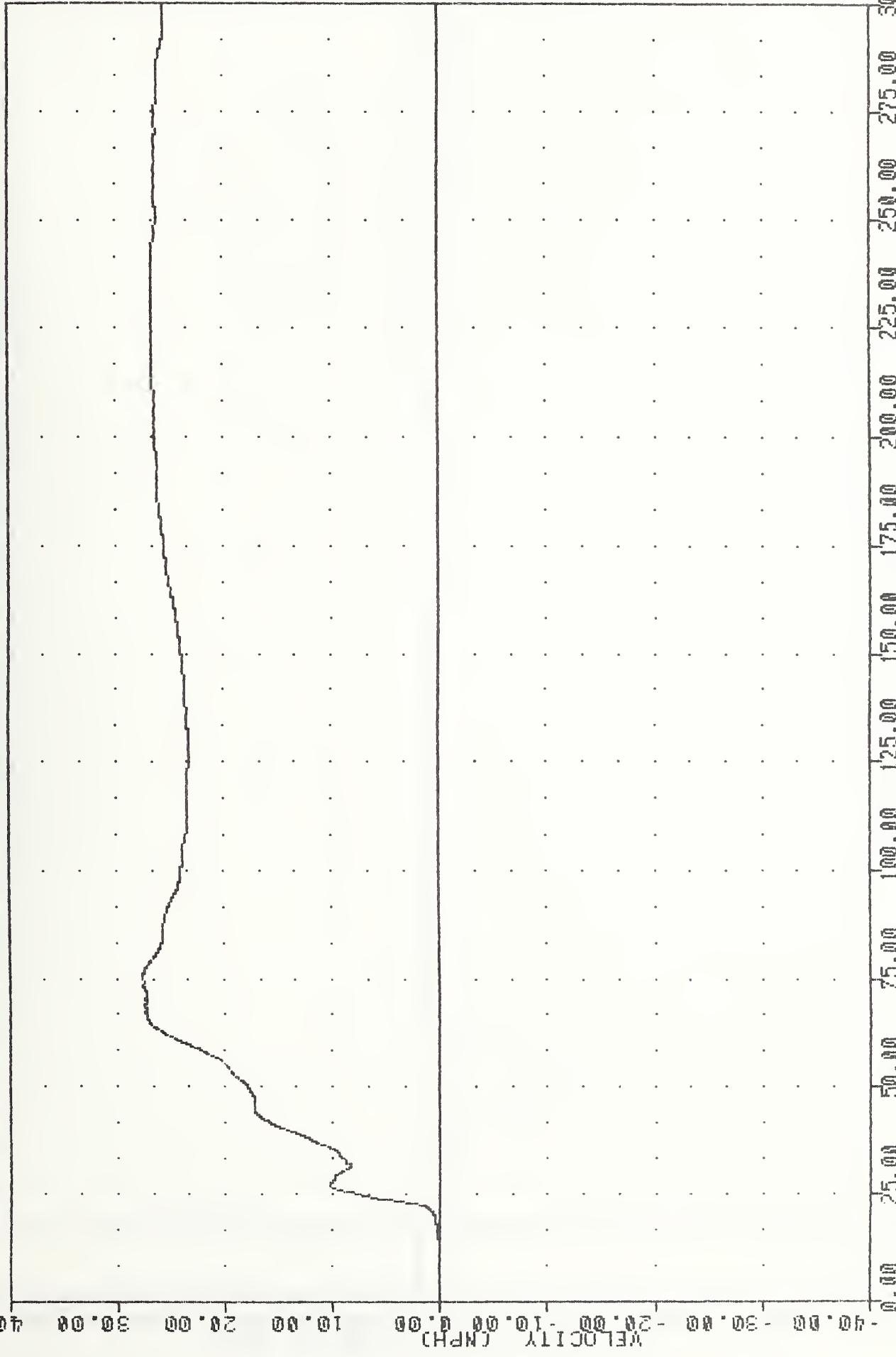
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -28.700 30.00 , 99.53 & 24.38



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CHASSIS
DRIVER LEFT LOWER ABDOMEN RIB Y-AXIS ACCELERATION

910604
LEFT SIDE IMPACT
91155
LLAYW1

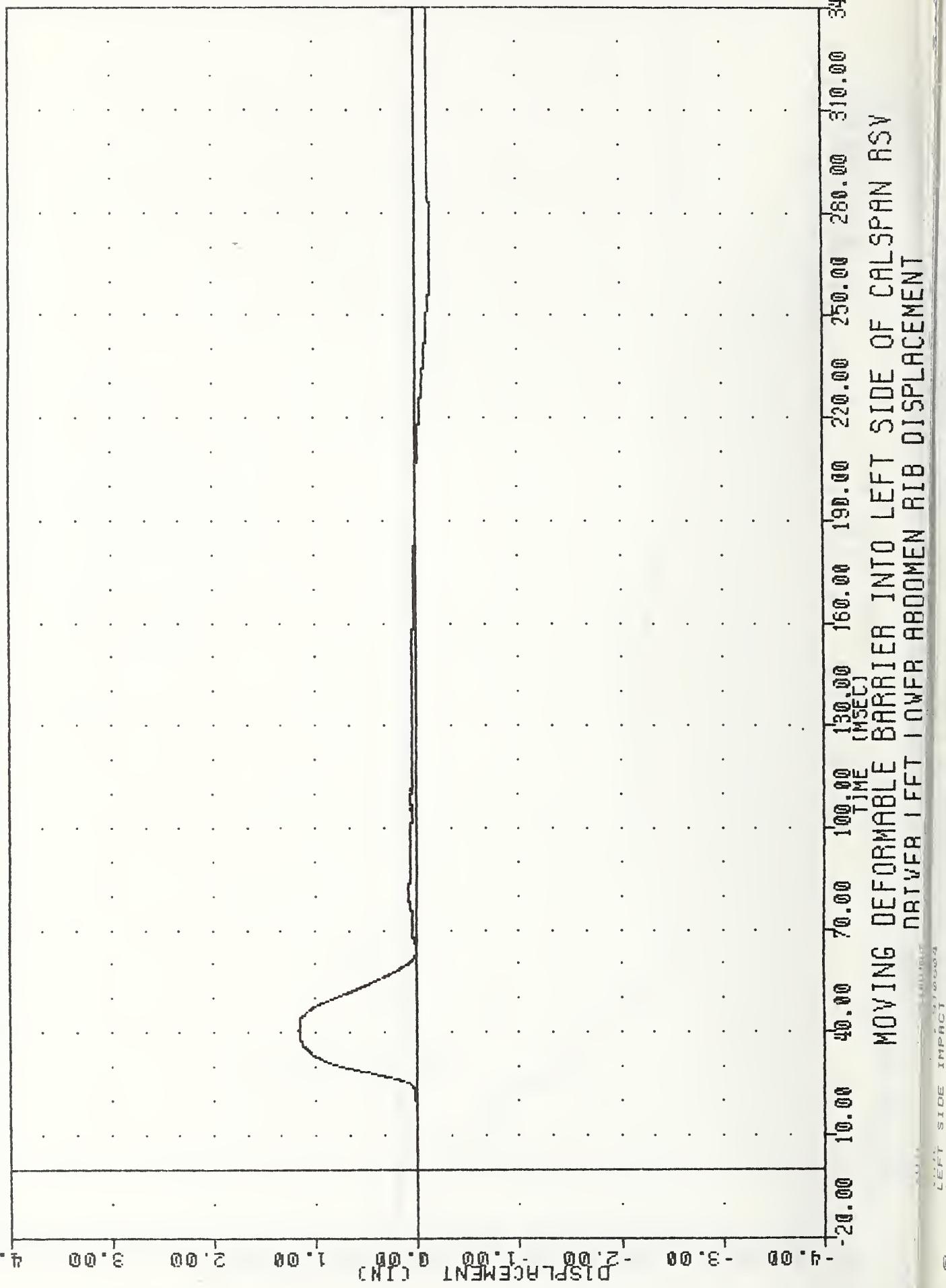
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.028 3.13 . 27.60 0 75.13



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CHASSIS
DRIVER LEFT LOWER ABDOMEN RIB Y-AXIS VELOCITY

YRTC
LEFT SIDE IMPACT
91155
LLAY01

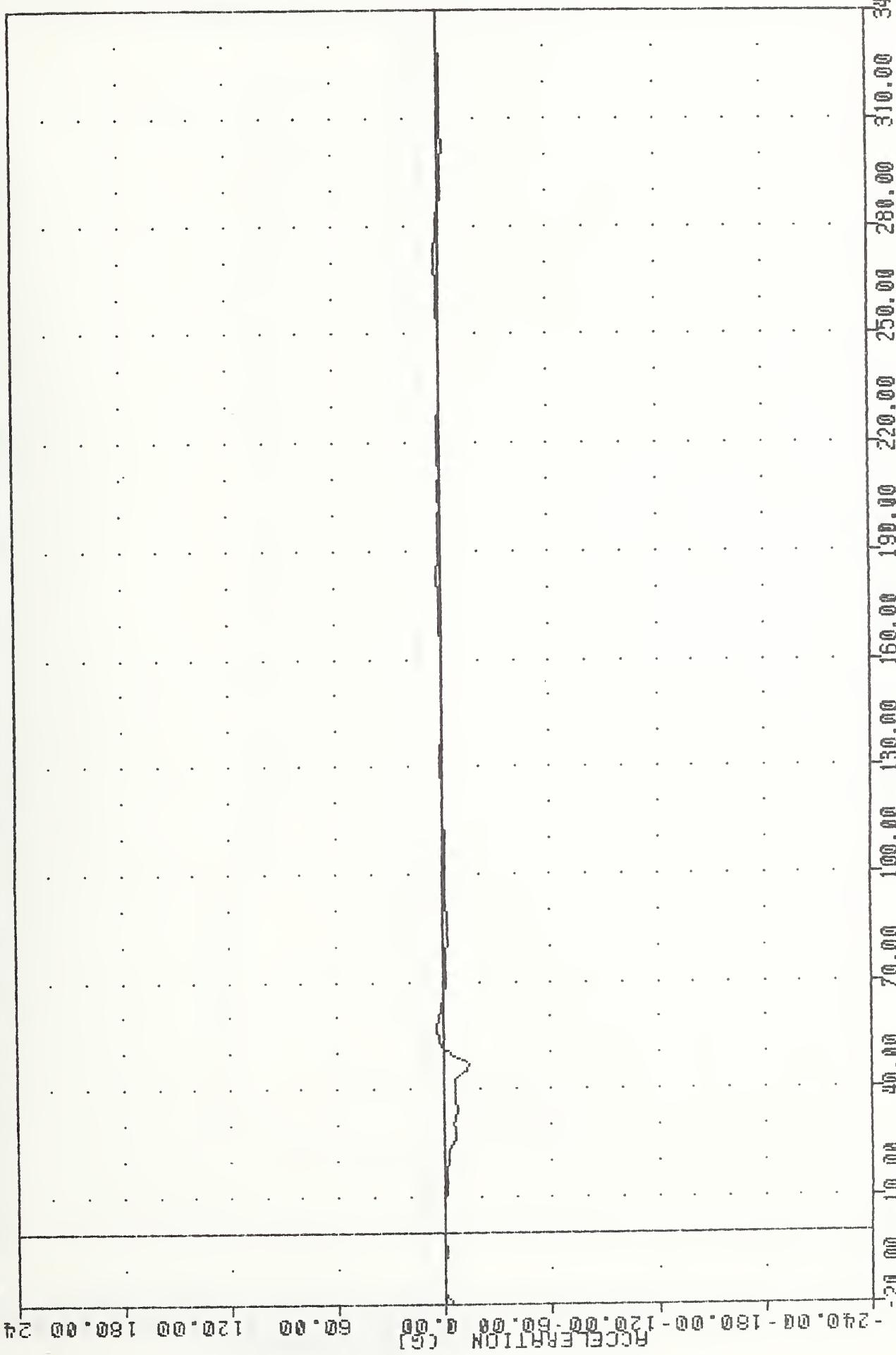
FILTER = BLFF 3000/ 949/ -40
MIN, MAX VALUES = -0.158 275.00 , 1.162 40.88



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER LEFT LOWER ABDOMEN RIB DISPLACEMENT

910604
91155
PEW91

RIGHT
LEFT SIDE IMPACT
FILTER = HSRI 136/
MIN. MAX VALUES = -13.488 46.25 , 3.89 & 56.87



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER PELVIS X-AXIS ACCELERATION

VERTIC
LEFT SIDE IMPACT

91155
PEVY61

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -7.96@ 99.37, 83.20@ 33.75

-240.00 -180.00 -120.00 -60.00 0.00 60.00 120.00 180.00 240.00

ACCELERATION (G)

-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
ROTHER PFI WITH Y-AXIS ACCELERATION

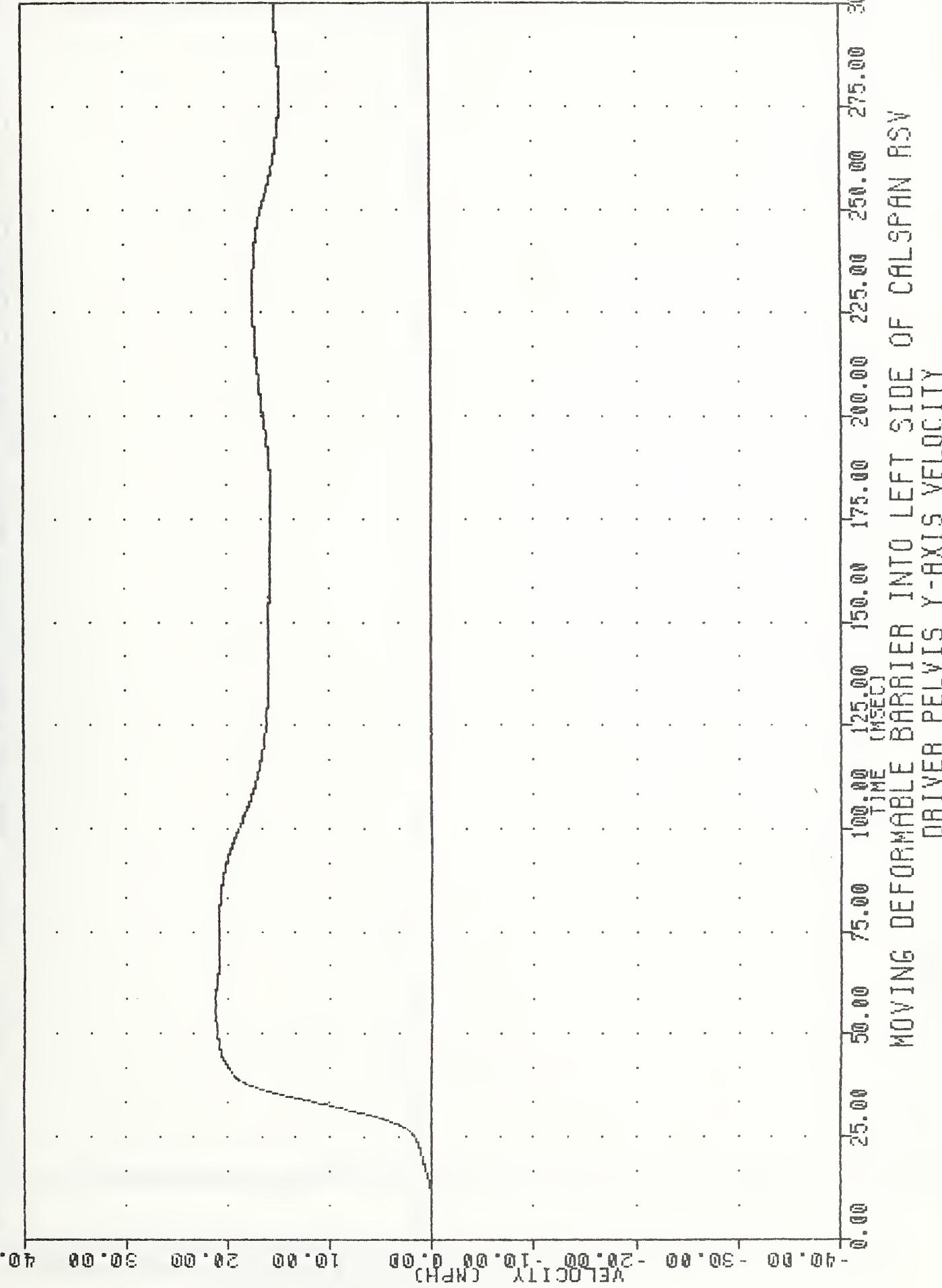
LEFT SIDE IMPACT

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN HS

ABXIEB PELVIS Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
91155
PEWV1

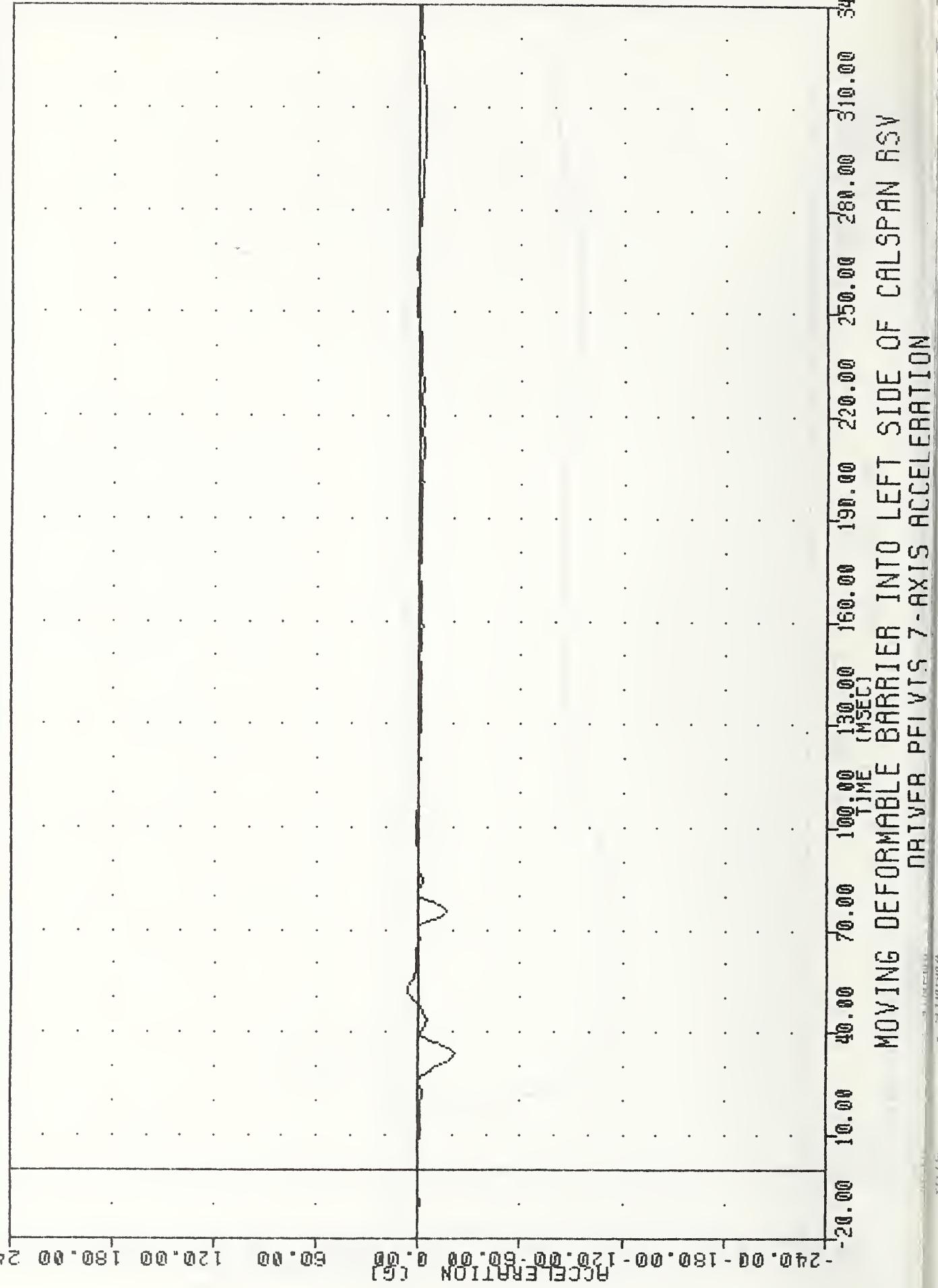
FILTER = RLFF 1650/ 5214/ -40
MIN, MAX VALUES = -0.028 3.75 , 21.25 & 56.38



WRTIC
LEFT SIDE IMPACT

91155
PEWZ61

189/ -50
FILTER = HSRI 136/
MIN, MAX VALUES = -20.738 33.75 ,
6.77 & 52.50

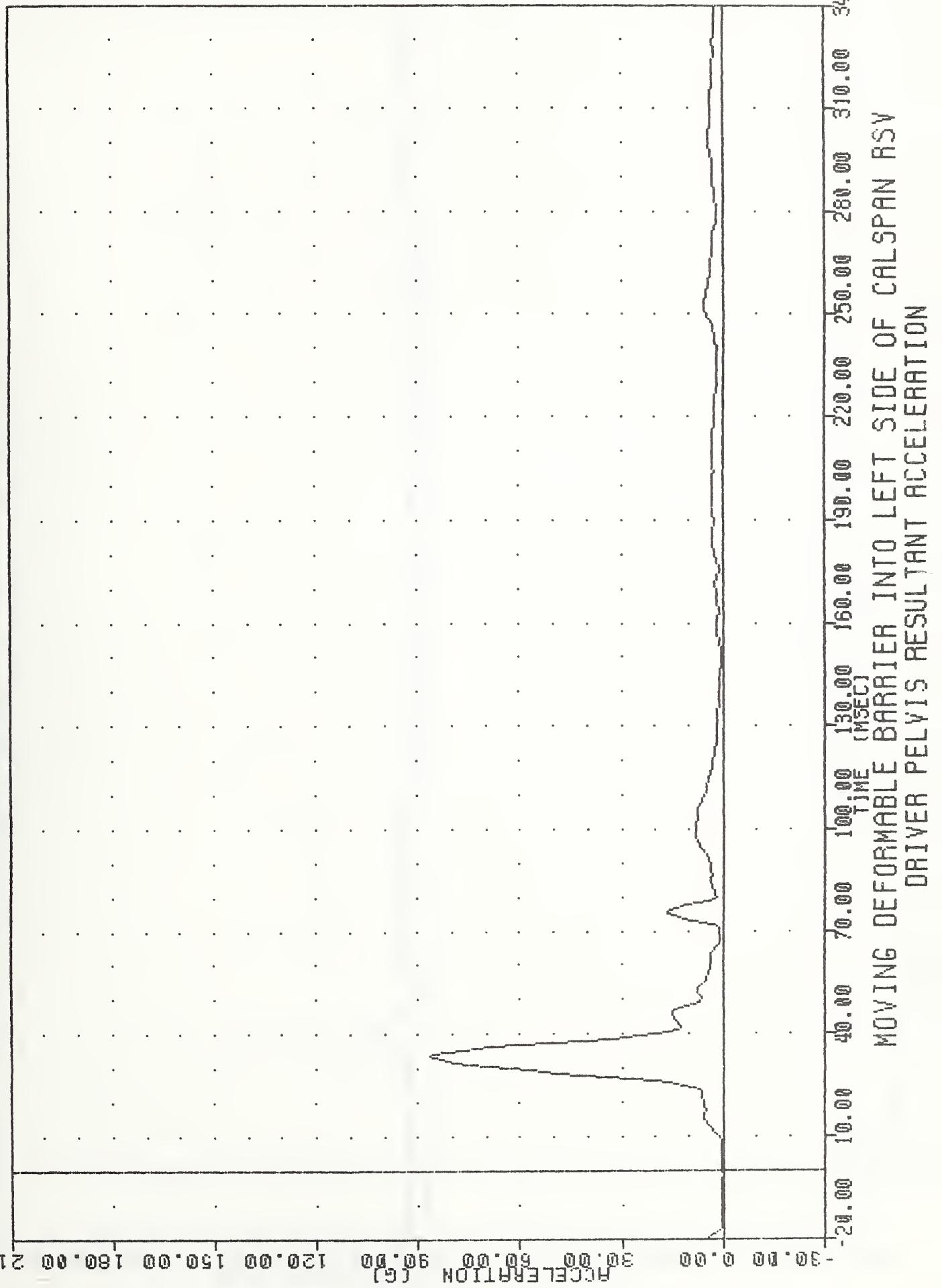


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER PELVIS Z-AXIS ACCELERATION

WTIC
910604
LEFT SIDE IMPACT

91155
PEVRG1

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = 0.098 -1.89 -86.05 33.75



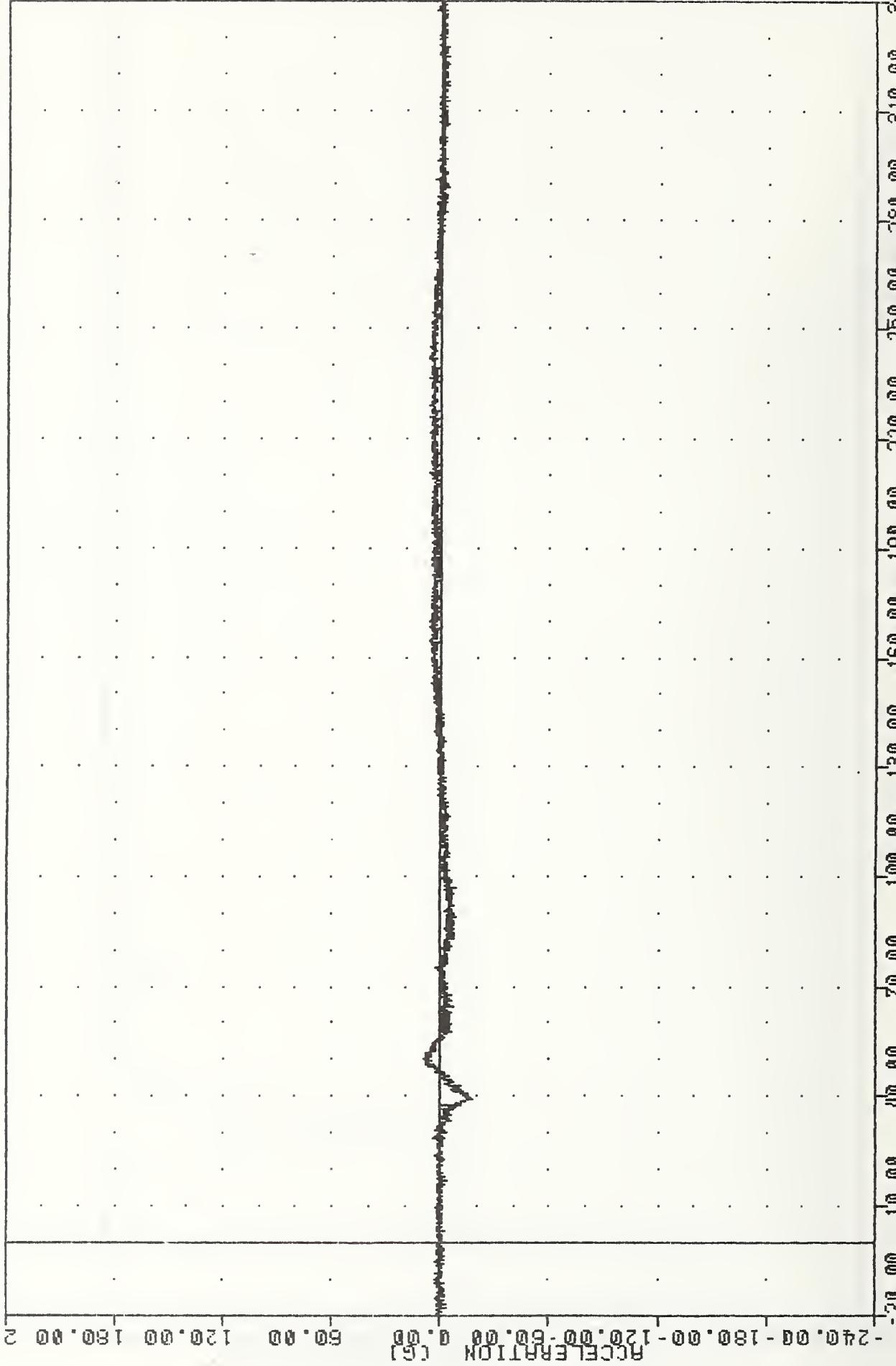
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
DRIVER PELVIS RESULTANT ACCELERATION

WFTC LEFT SIDE IMPACT 910604

HEODxG4
G1155

FILTER = ALPF 1650/ 524/ - 40
MIN, MAX VALUES = -16.91 e

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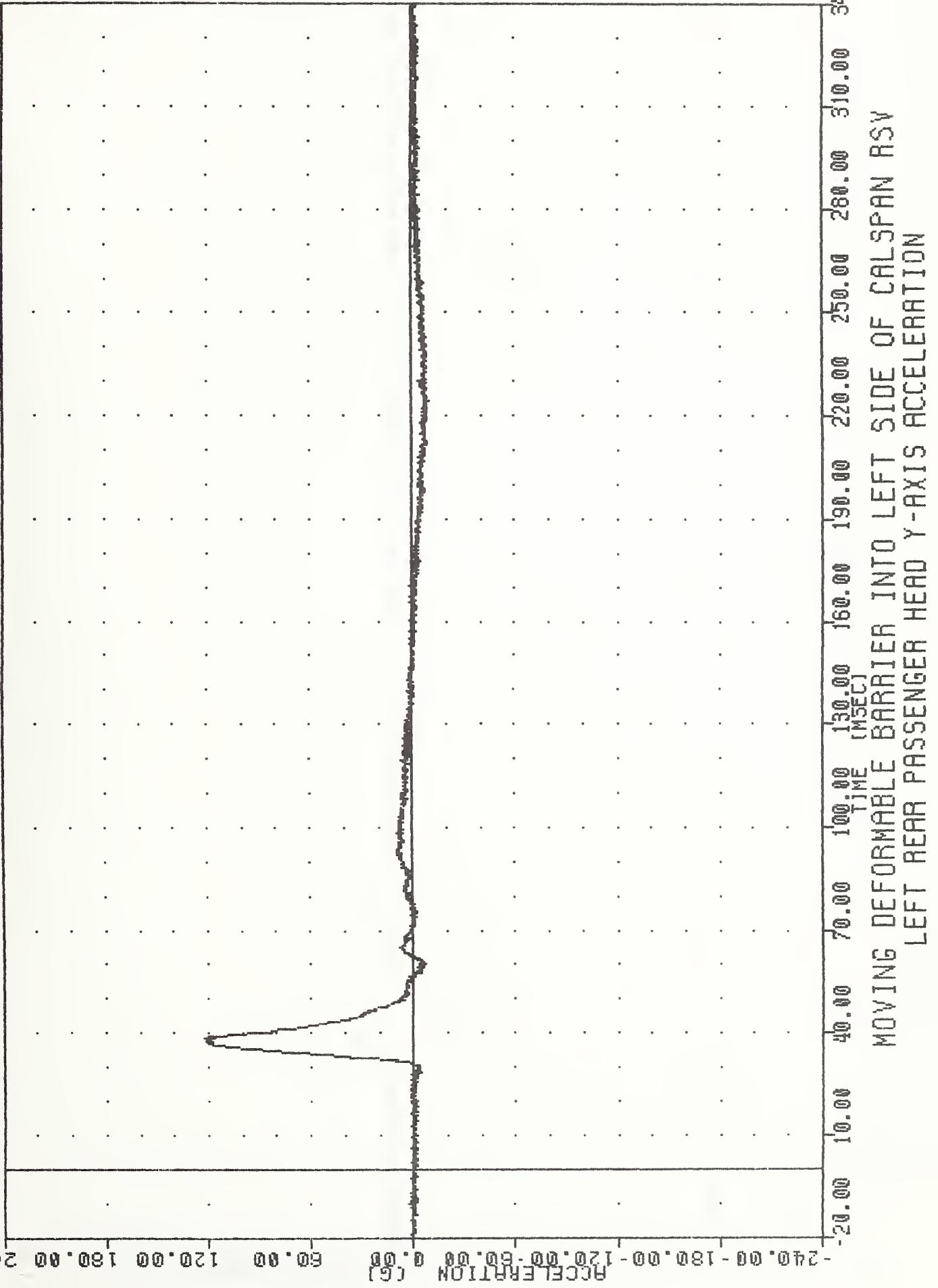
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER HEAD X-AXIS ACCELERATION

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MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER HEAD X-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
91155
HEDY64

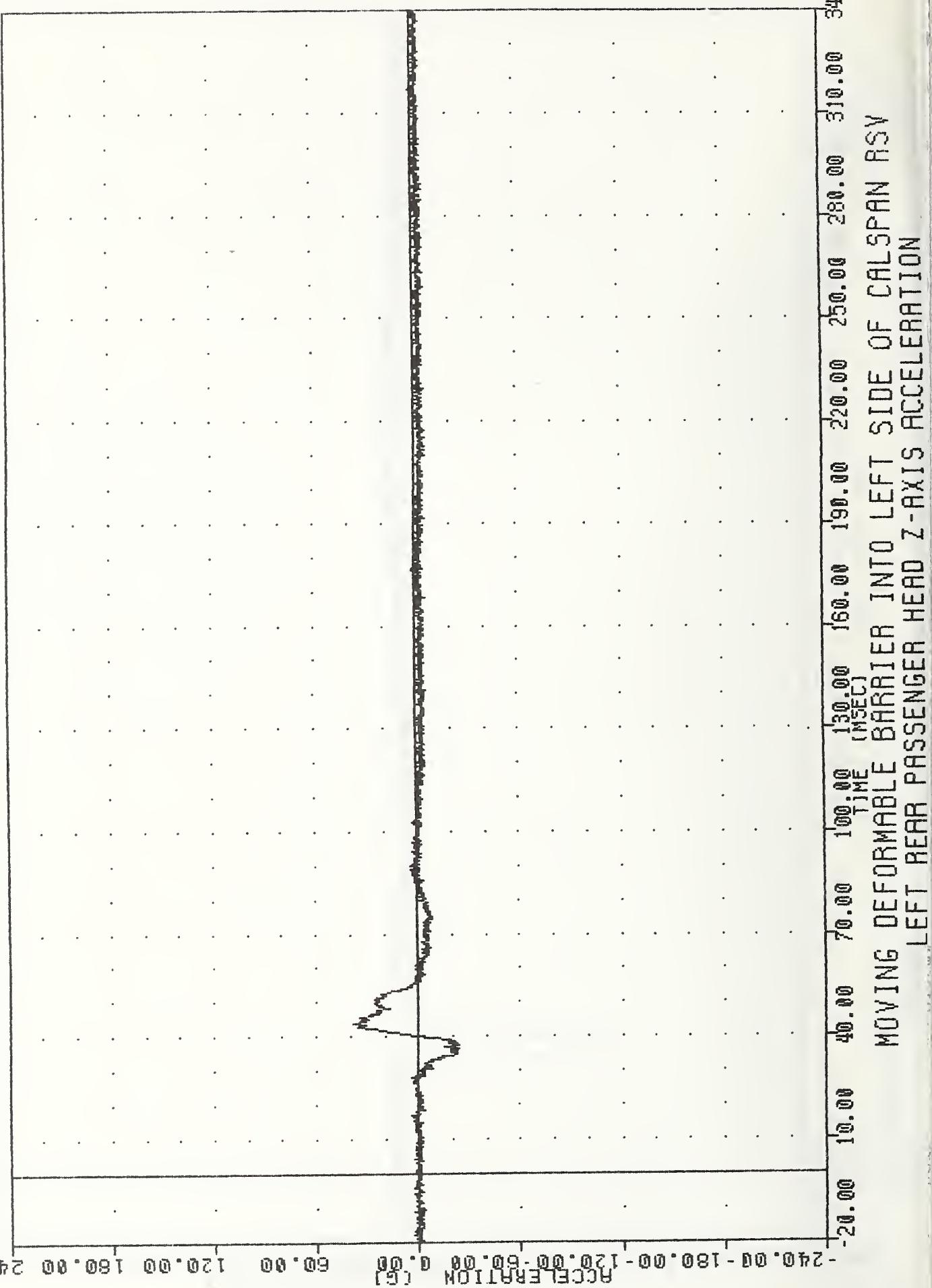
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -9.388 224.13 , 122.29 e 38.75



VRIC
LEFT SIDE IMPACT
91155
HEDZ64

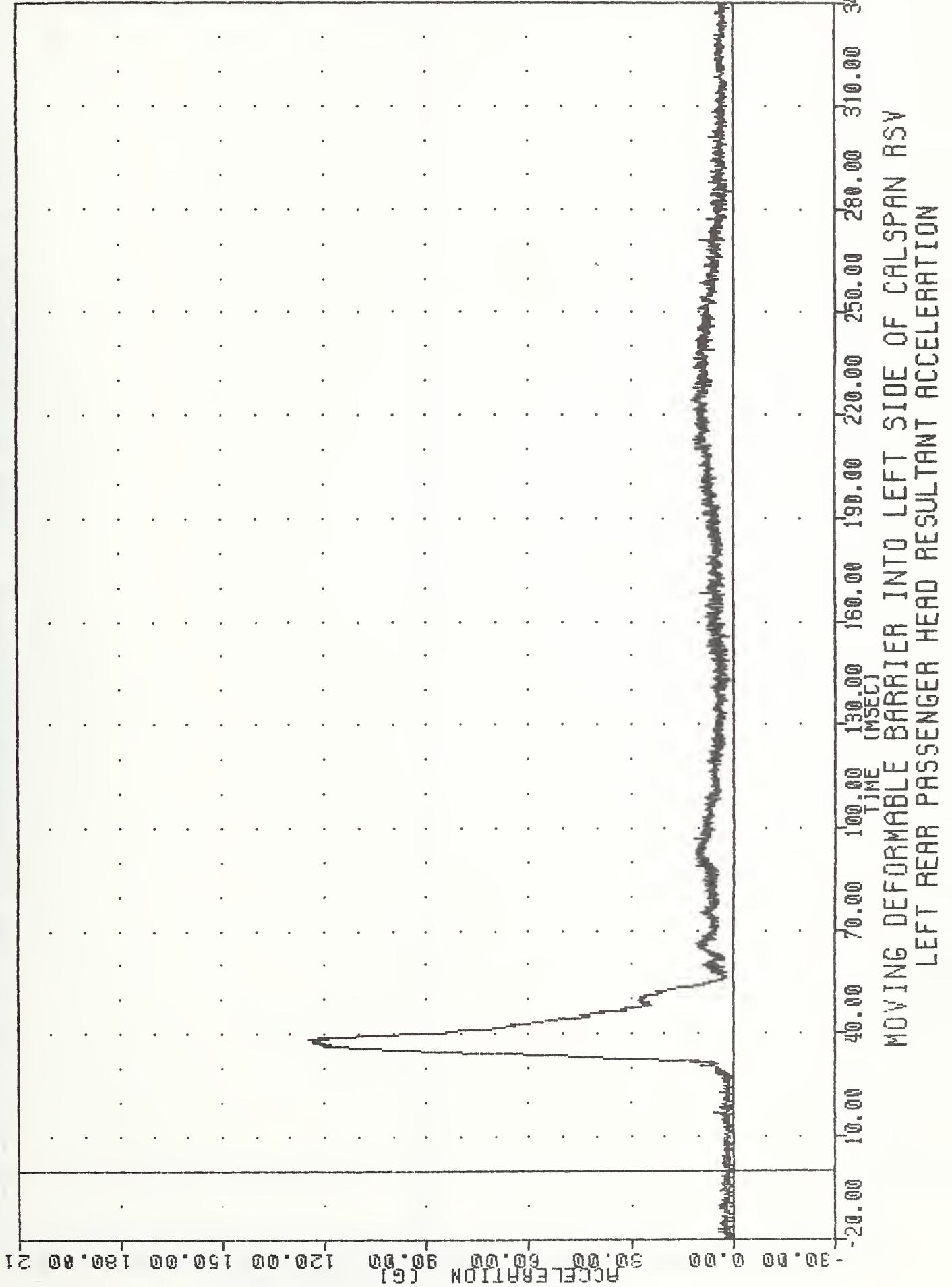
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -24.41@ 37.38 , 38.32 @ 43.88

910604



910604
LEFT SIDE IMPACT
91155
HEADGY

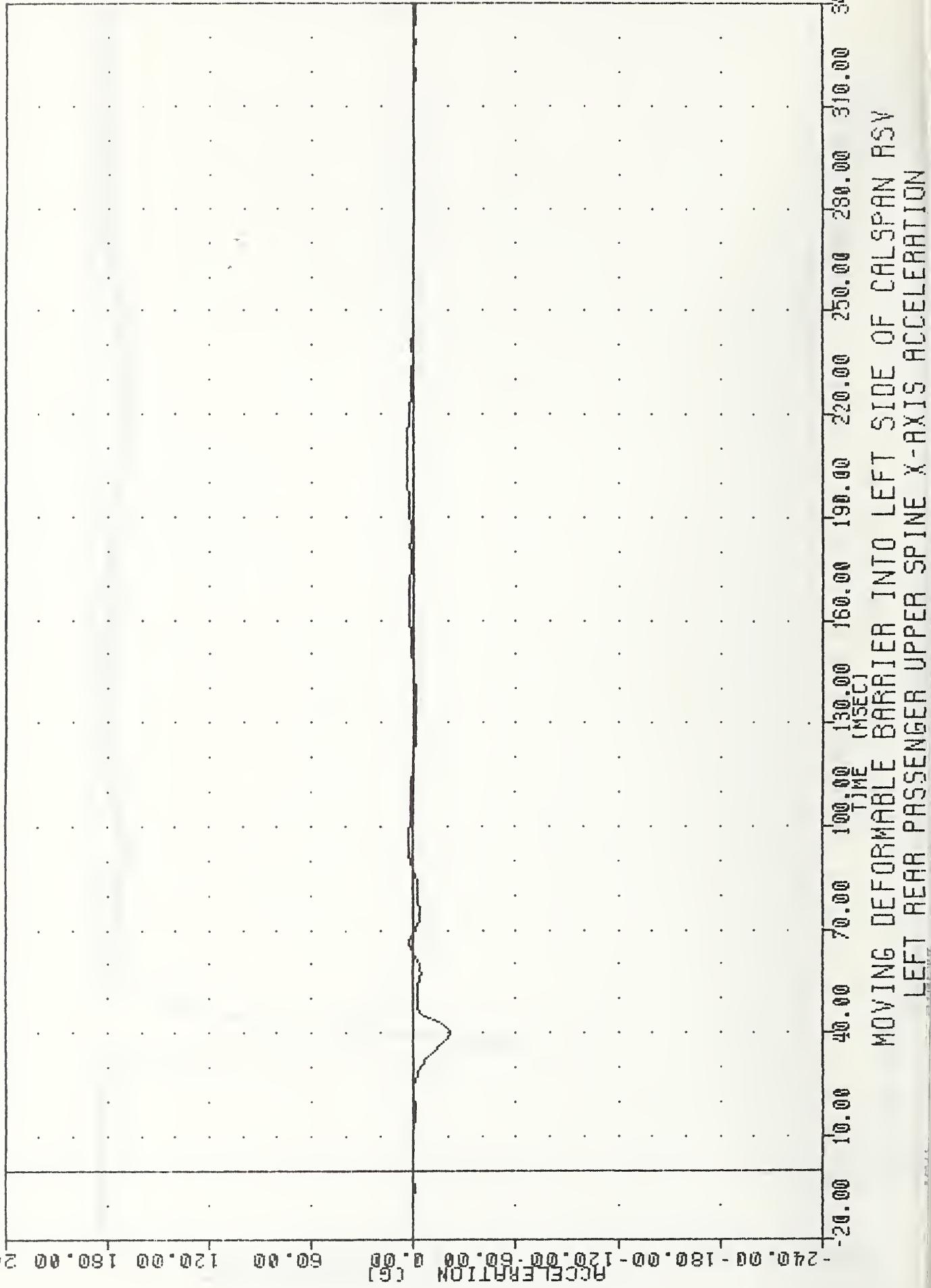
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.158 -19.54 124.40 0 38.75



LETTER FROM THE MERCY HOME

101X64
91155
G118

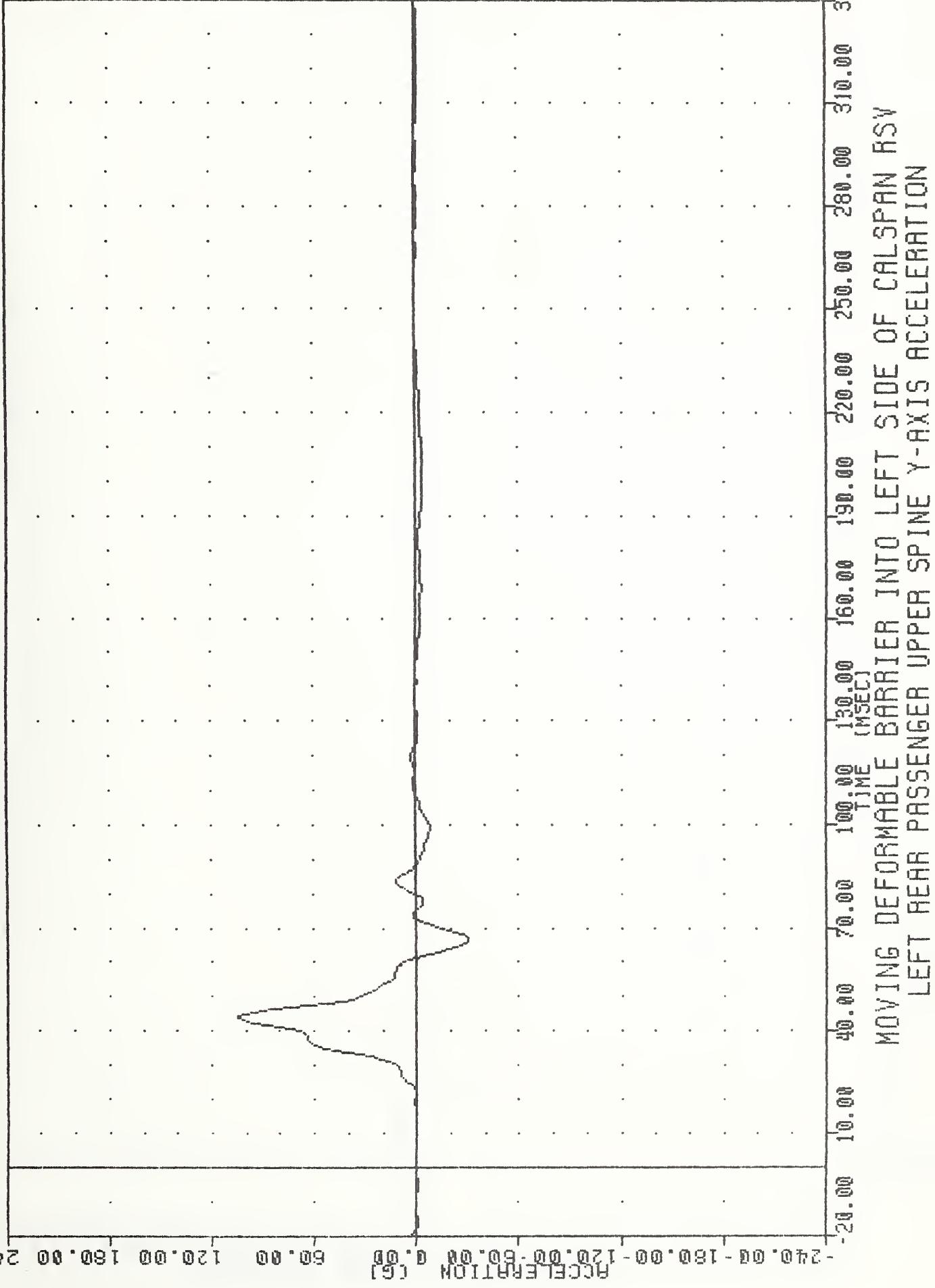
FILETR = HSPL1 136/ MIN, MAX VALUES = -21.478 1189/-50



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER UPPER SPINE X-AXIS ACCELERATION

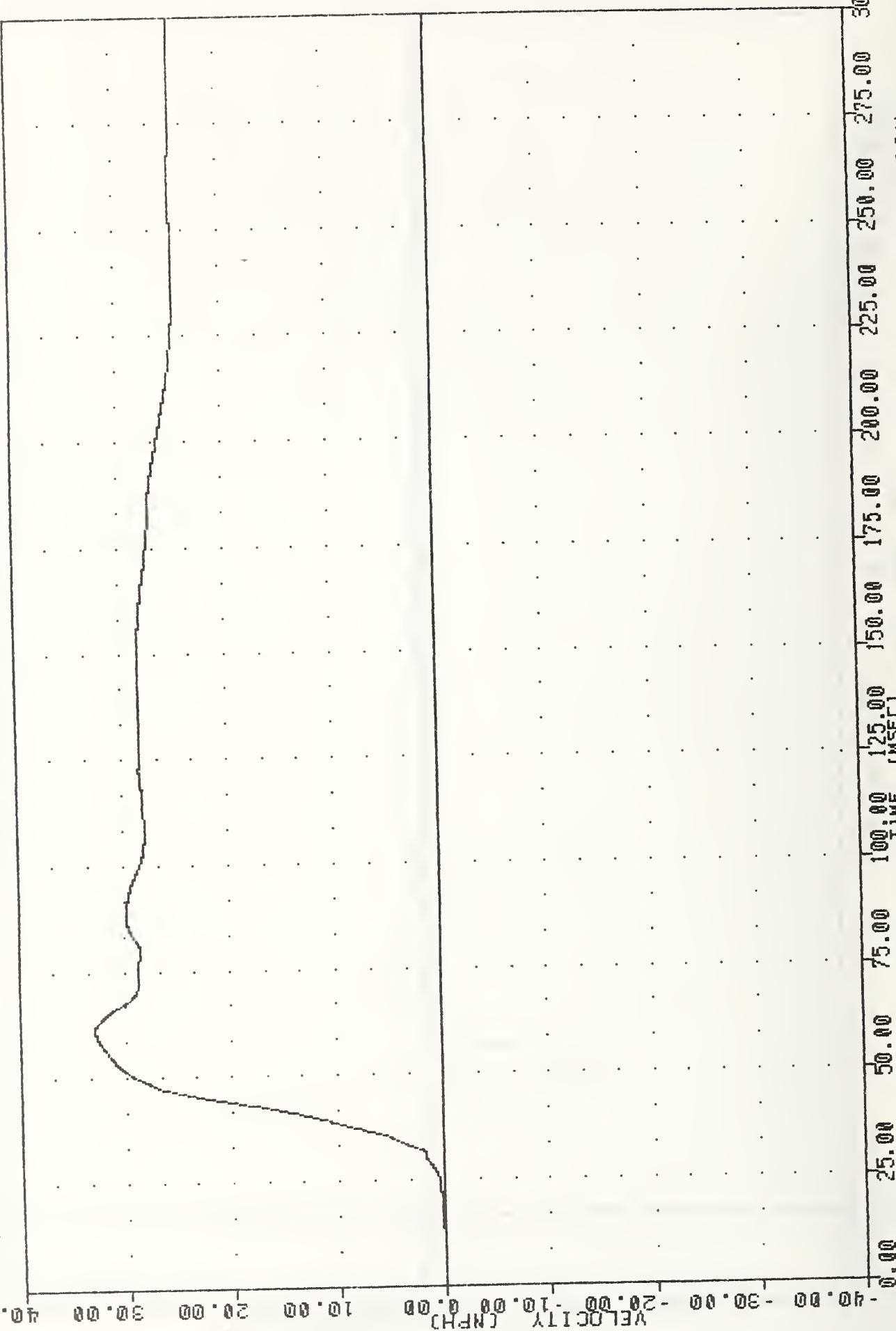
YATC
910604
LEFT SIDE IMPACT
91155
101Y4

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -30.308 66.87 - 105.30 8 43.75



VRTC
LEFT SIDE IMPACT
91155
101Y4

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.0008 1.13 • 32.89 e 61.25



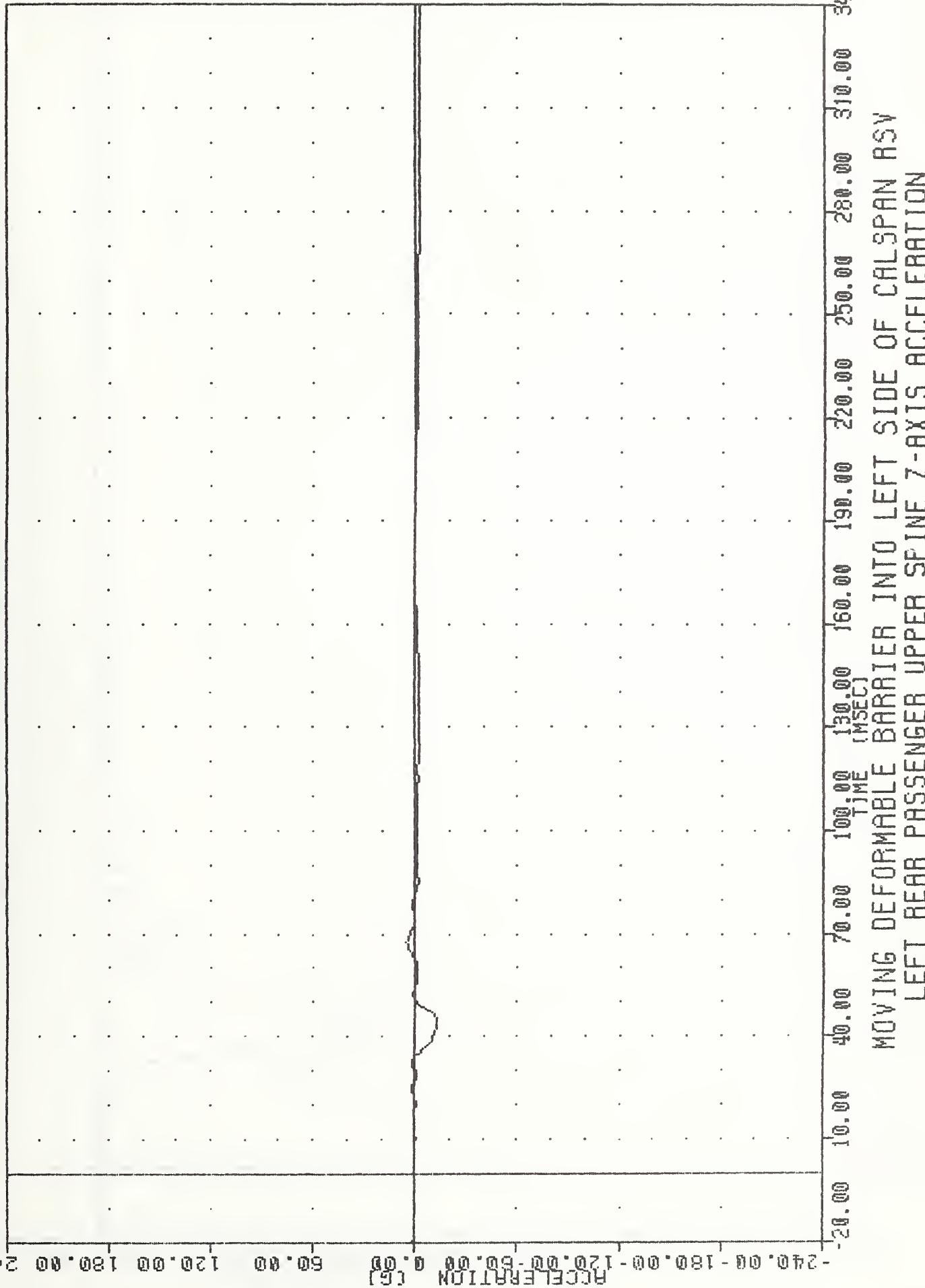
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
FF7 REAR PASSENGER UPPER SPINE Y-AXIS VELOCITY

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER UPPER SPINE Y-AXIS VELOCITY

YRIC
LEFT SIDE IMPACT

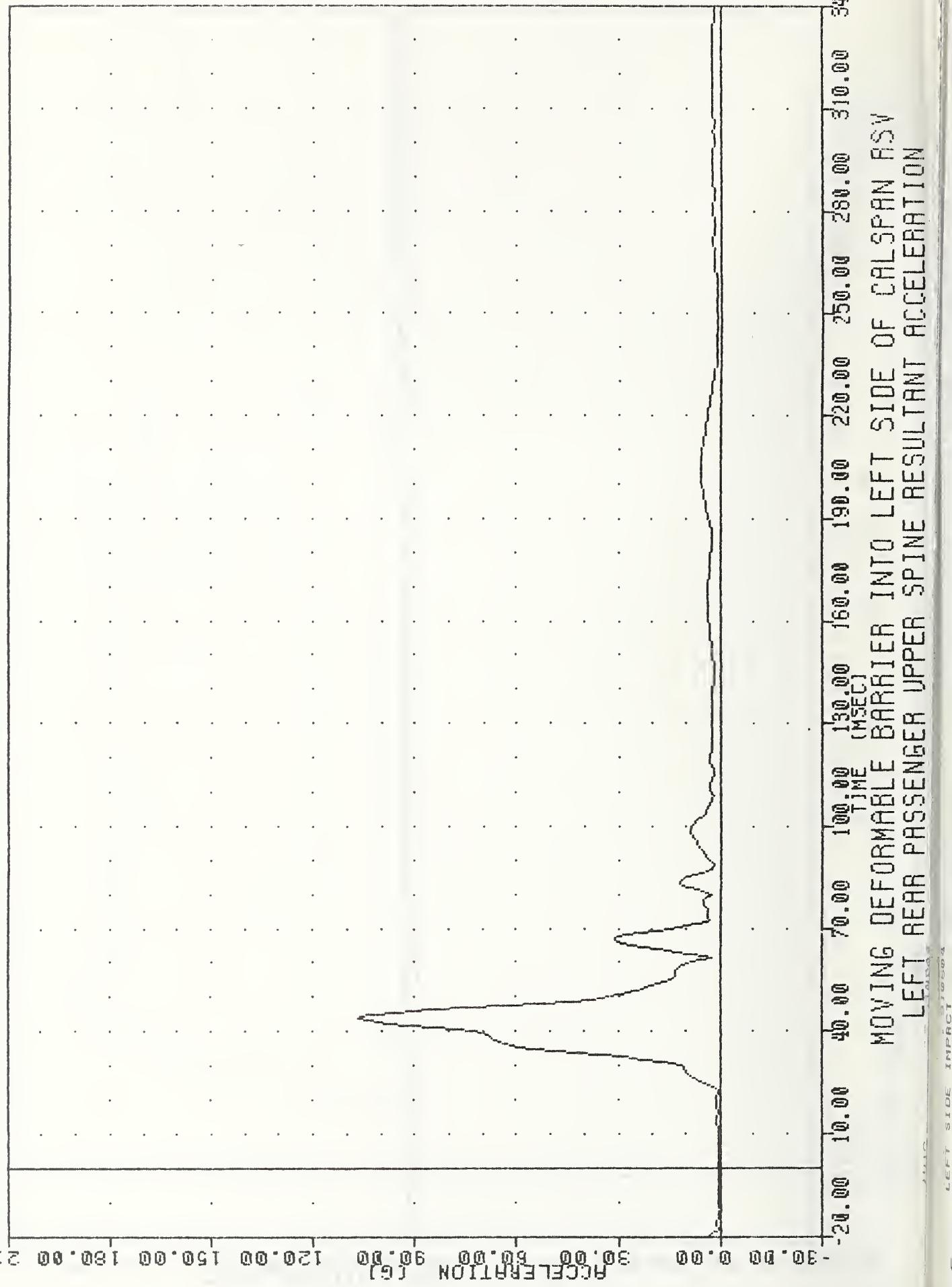
91156
T01764

FILTER = HSR1 136/ 189/ -50
MIN. MAX VALUES = -12.65@ 44.39 , 4.88 @ 67.5@



VRTC
LEFT SIDE IMPACT
91155
T01RG4

FILTER = HSRII 136/ 189/ -50
MIN, MAX VALUES = 0.108 -12.50 , 106.67 & 43.75

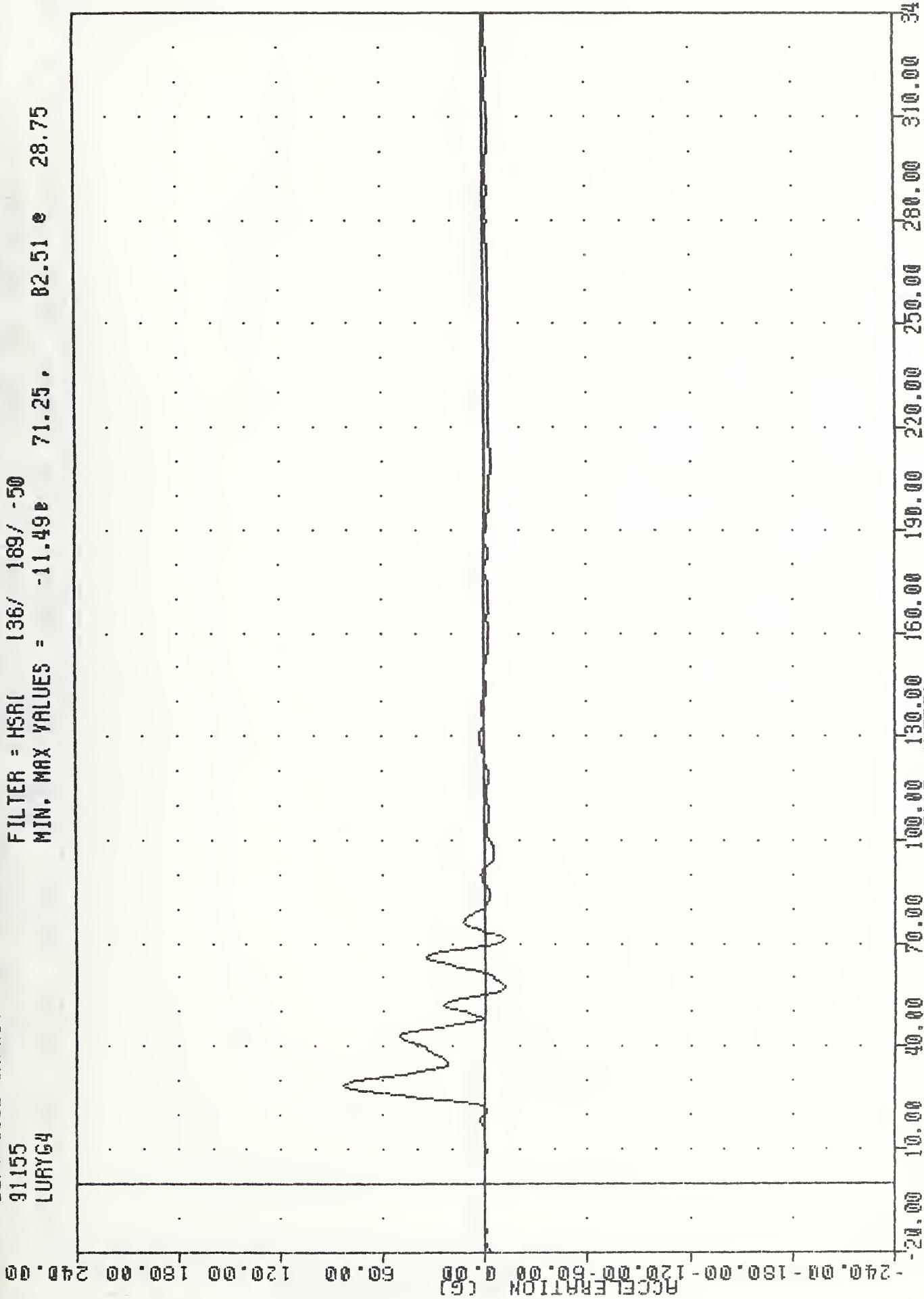


910604

LEFT SIDE IMPACT

91155
LURG4

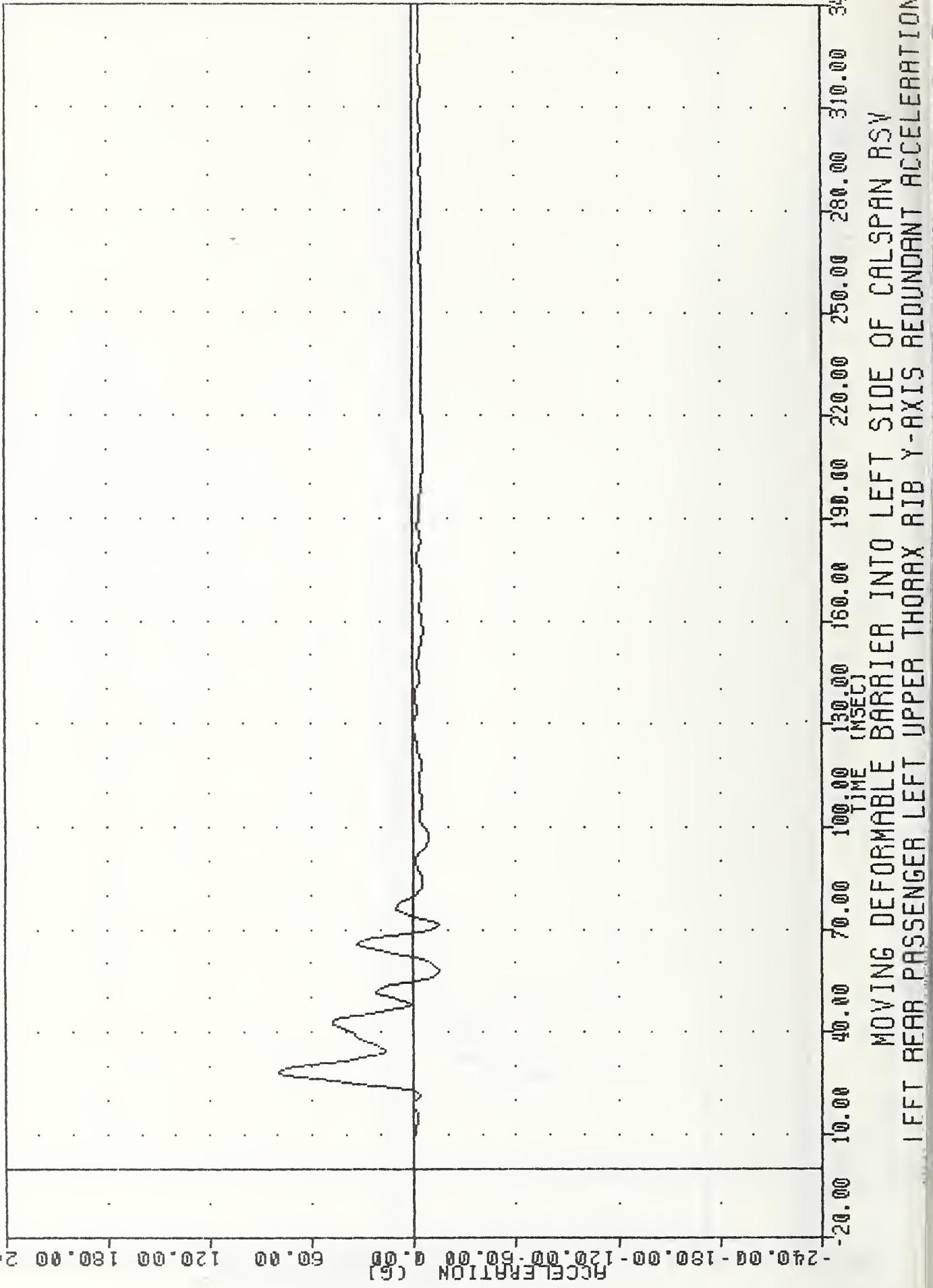
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -11.49e 71.25 . 82.51 e 28.75



Moving deformable barrier into left side of carspan PSV
left rear passenger upper thorax rib y-axis acceleration

VRTC 910604
LEFT SIDE IMPACT
91155
LURYGO

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -14.82@ 57.50 , 78.79 @ 28.75



LEFT REAR PASSENGER LEFT THORAX RIB Y-AXIS REDUNDANT ACCELERATION
MOWING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT SIDE IMPACT

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
REAR PASSENGER LEFT UPPER THORAX RIB Y-AXIS REBOUNDANT

VRIC
LEFT SIDE IMPACT
91155
LURV44

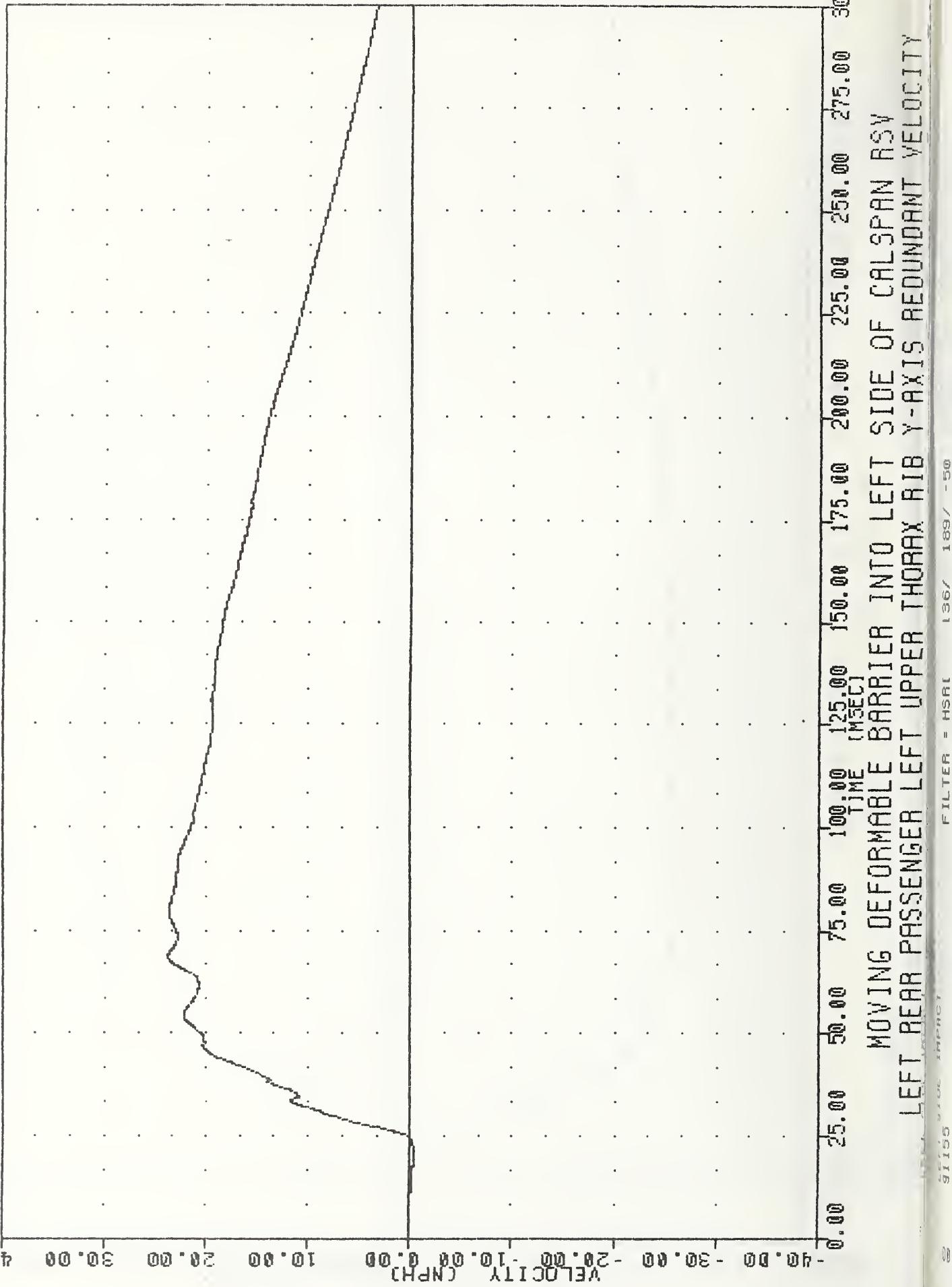
FILTER = ALPF 165.0/ 5214/ -40
MIN, MAX VALUES = -0.028 12.00 . 27.79 & 82.00

0.00 25.00 50.00 75.00 100.00 125.00 150.00 175.00 200.00 225.00 250.00 275.00 300.00

TIME [MSEC]
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER LEFT UPPER THORAX RIB Y-AXIS VELOCITY

YRTC
LEFT SIDE IMPACT
91155
LURVYD

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.398 20.63 , 23.75 & 68.38

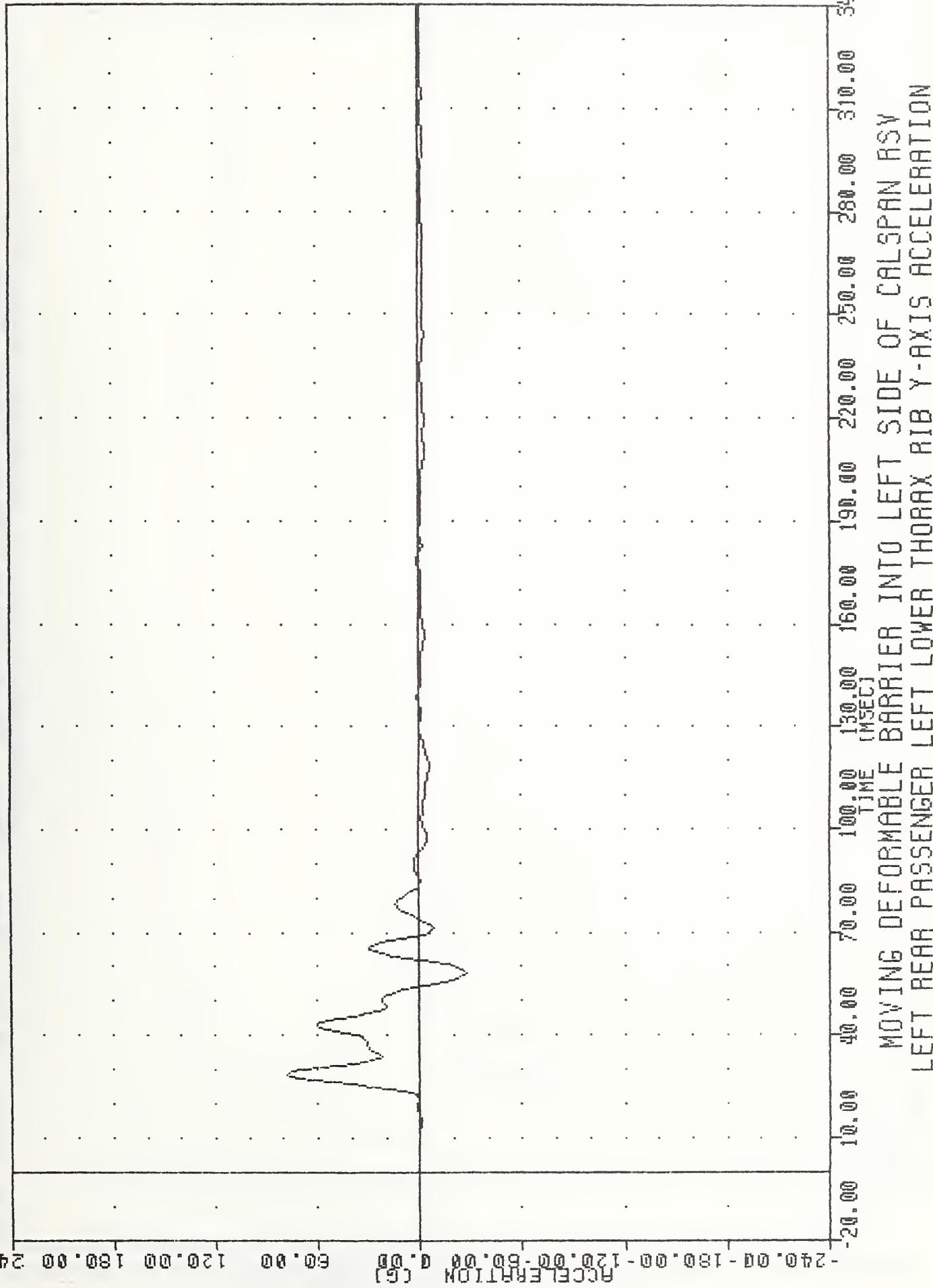


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER LEFT UPPER THORAX RIB Y-AXIS ACCELERATION

LEFT SIDE IMPACT

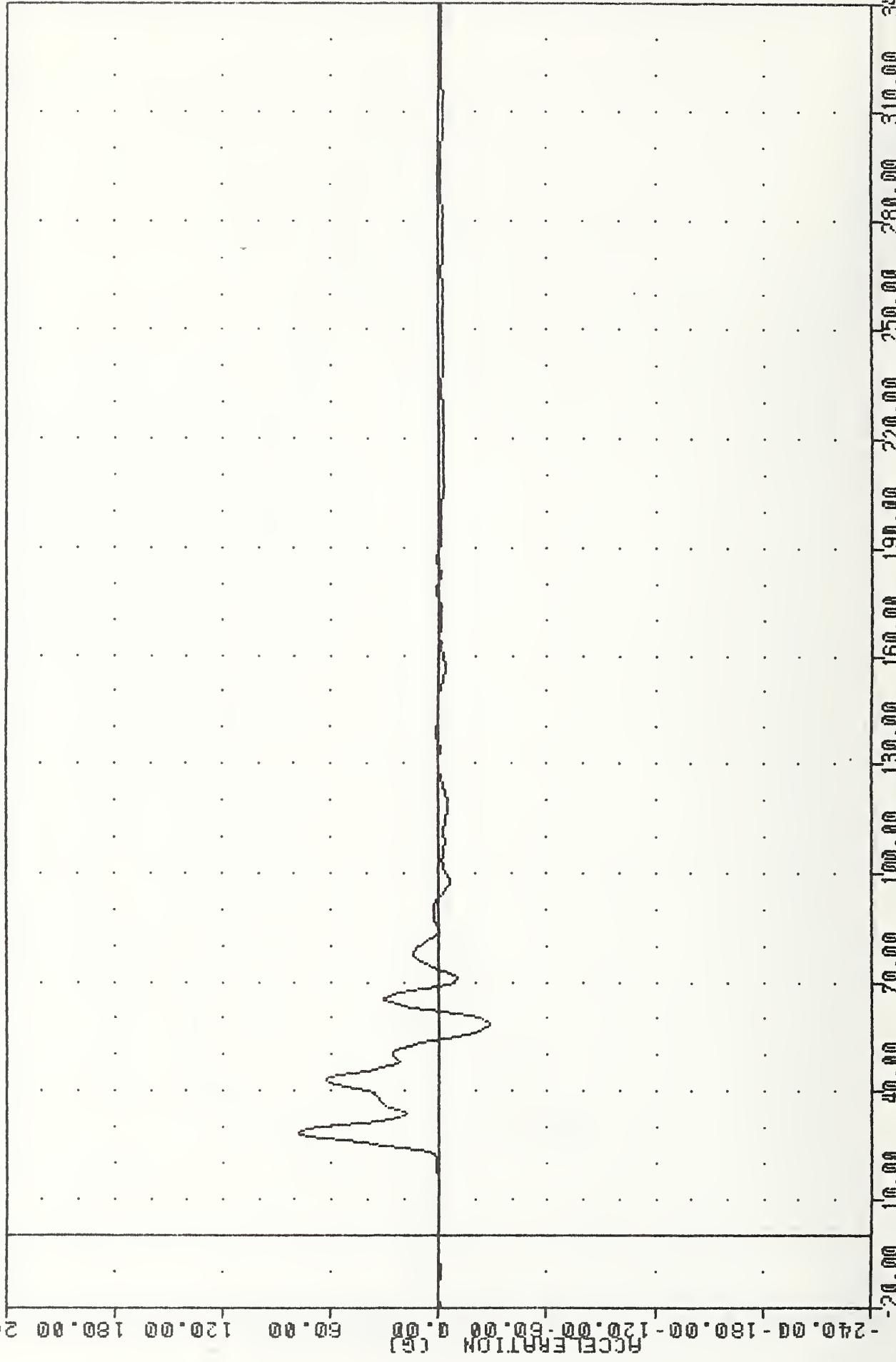
91155
LLRY64

FILTER = HSRI
MIN, MAX VALUES = -27.06@ 58.13 . 78.38 @ 28.75



WATC , 910604
LEFT SIDE IMPACT
91155
LLRY60

FILTER = HSRI (36/ 189/ -50
MIN, MAX VALUES = -27.878 58.13 , 78.25 8 28.75

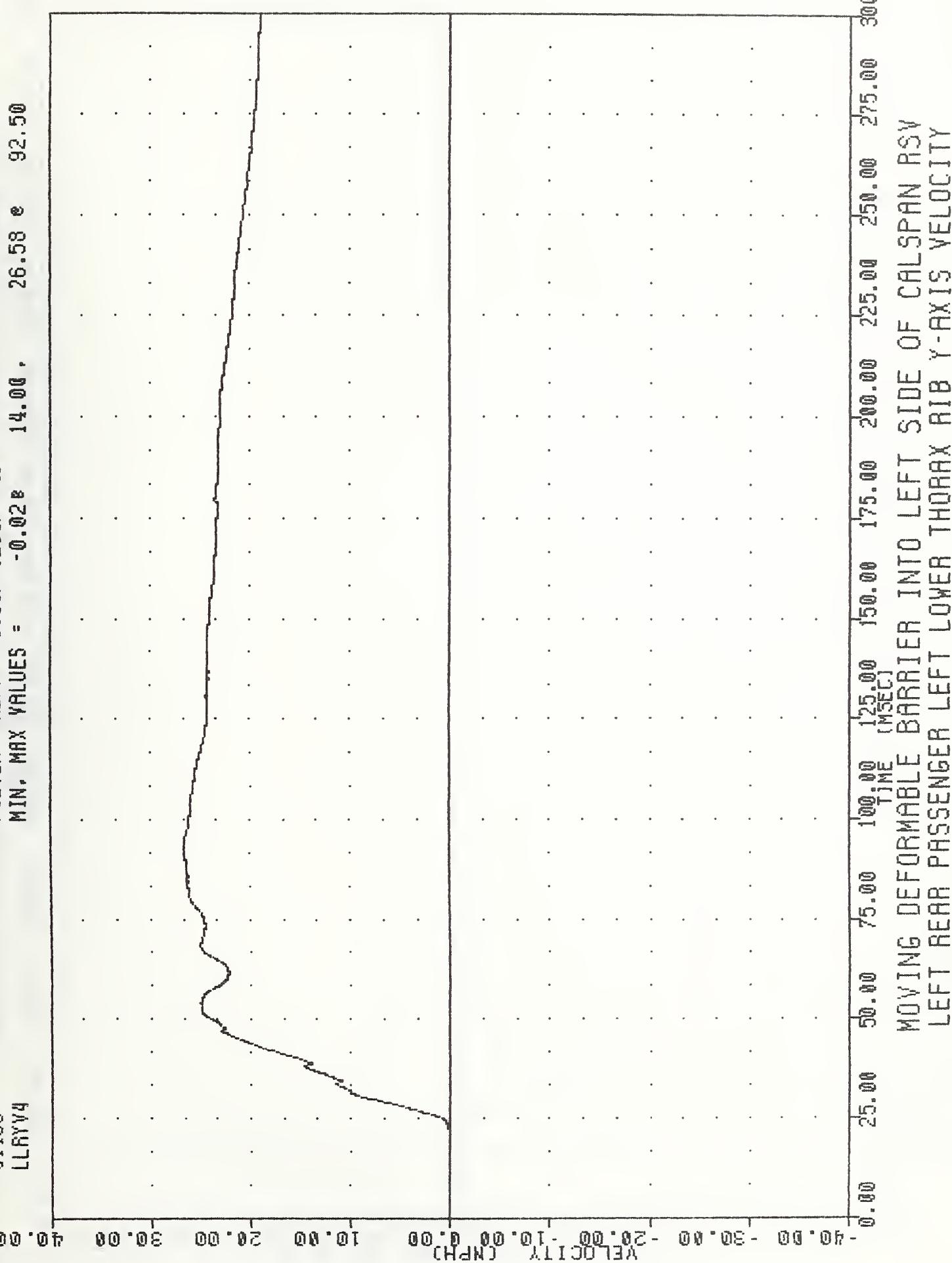


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
FFT REAR PASSNGR FFT LOWER THORAX RIB Y-AXIS REDUNDANT ACCELERATION
FILTER = FILPF 1650/ 5214/ -40

LEFT SIDE IMPACT
91155
FILTER = FILPF

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
VEHICLE IMPACT, 310004
LEFT REAR PASSENGER LEFT THORAX RIB Y-AXIS
IMPACT

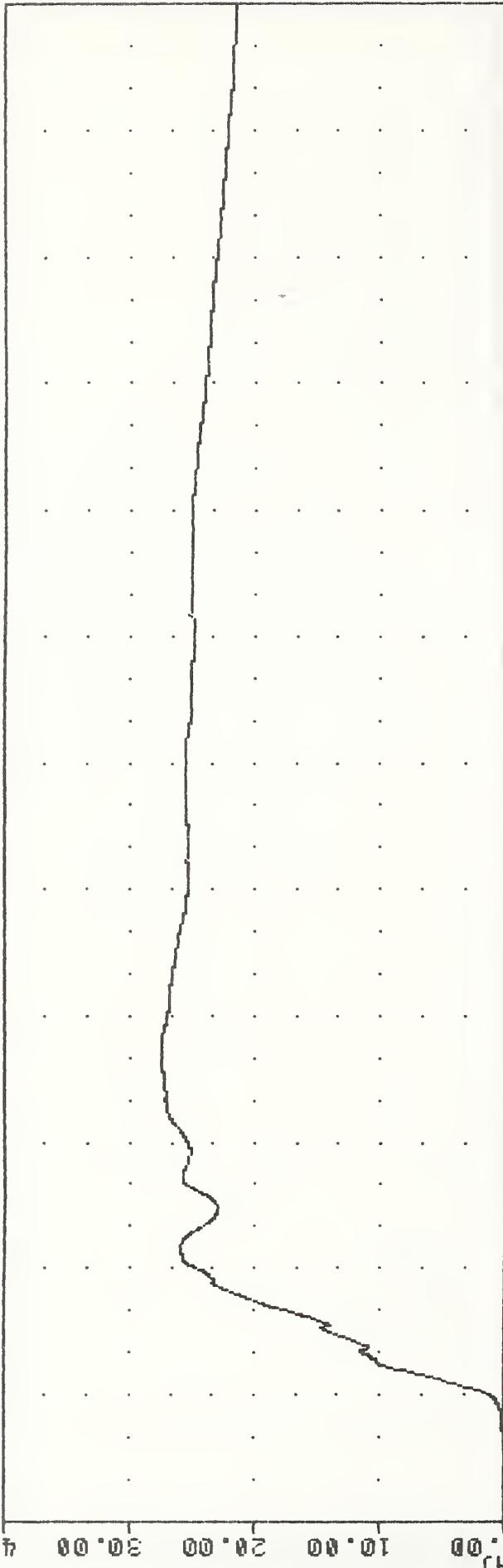
FILTER = ALPF 16500/ 5214/ -40
MIN. MAX VALUES = -0.028 14.00 . 26.58 e 92.50



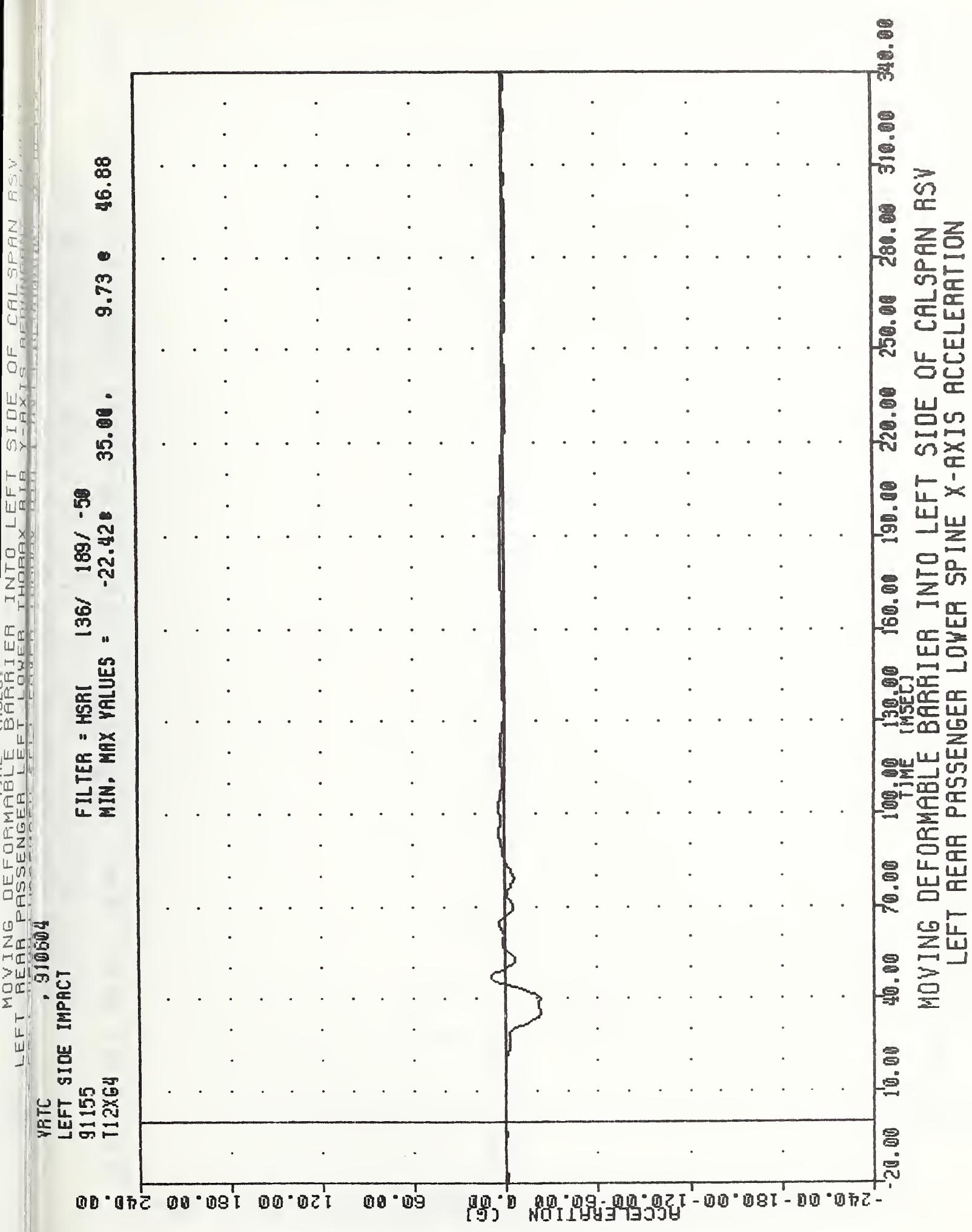
WRTC - 910604
LEFT SIDE IMPACT

91155
16
LLRHYD

FILTER = ALPF 1650/ 5214/-40
MIN. MAX VALUES = 0.0000

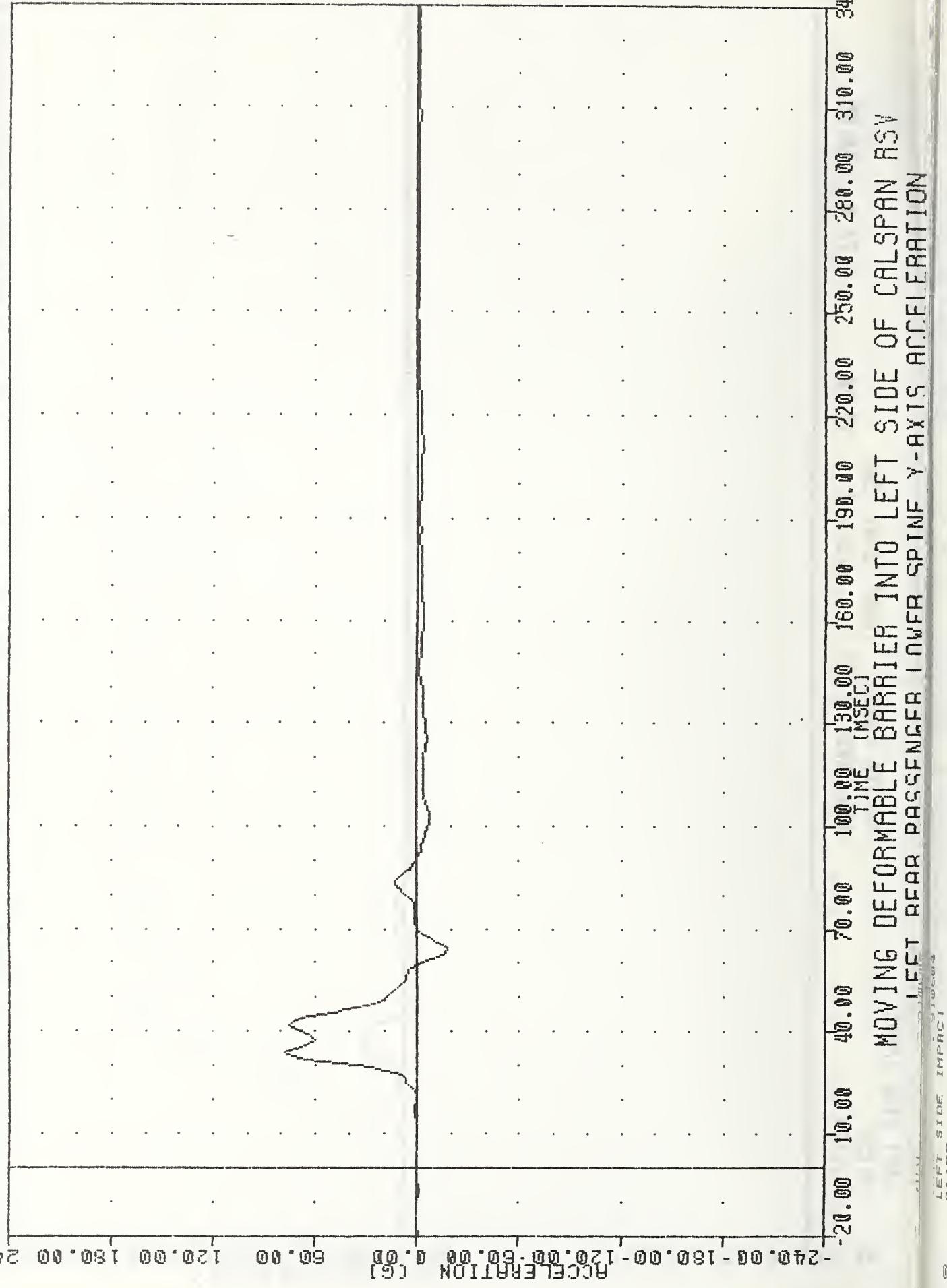


LEFT REAR PASSENGER LEFT LOWER THORAX R18 Y-AXIS REDUNDANT VELOCITY
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
6.00 25.00 50.00 75.00 100.00 125.00 150.00 175.00 200.00 225.00 250.00 275.00 300.00



VRTC
LEFT SIDE IMPACT
91155
T12Y64

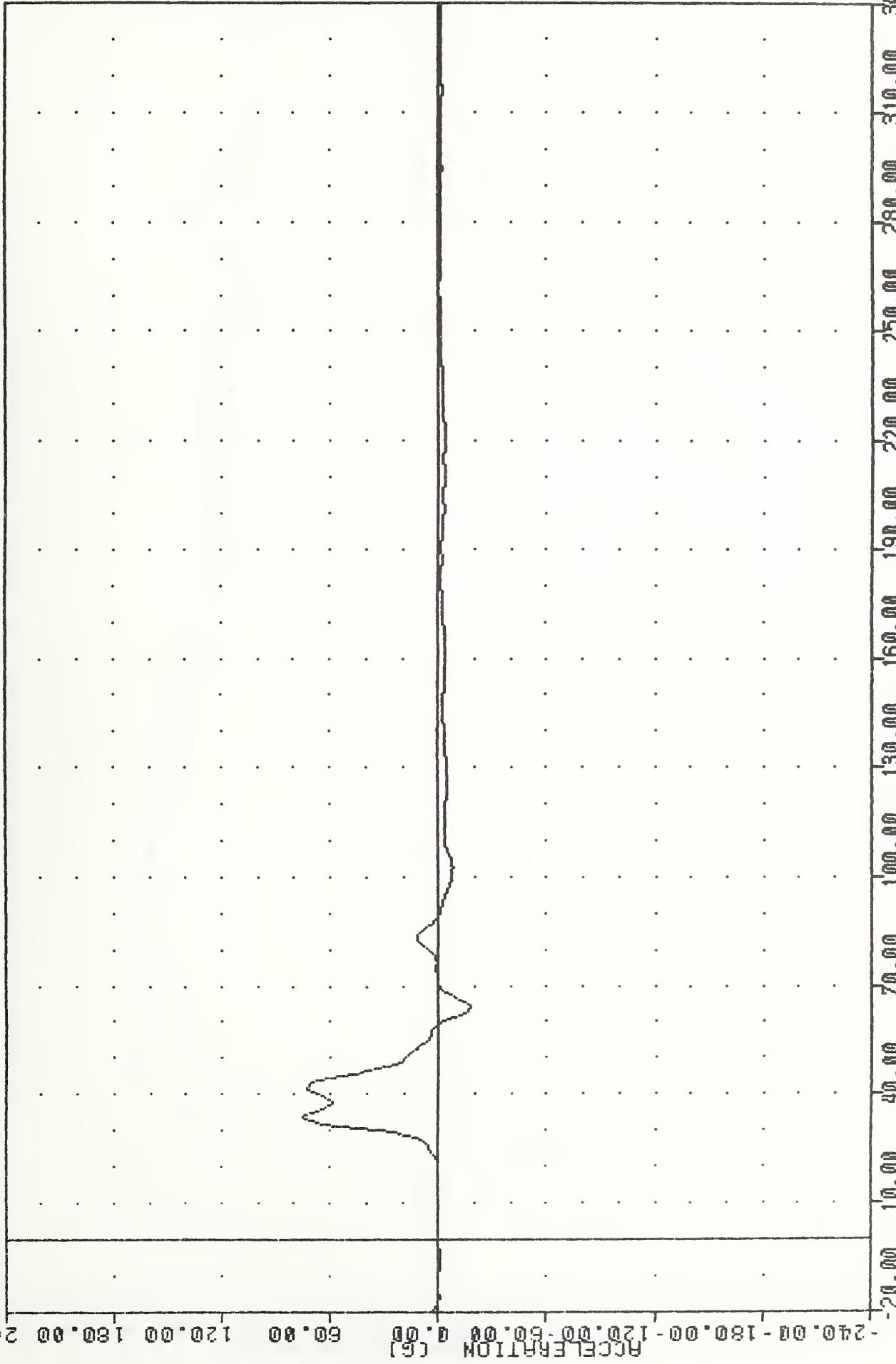
FILTER = HSRI 136/ 189 / -50
MIN, MAX VALUES = -17.448 63.75 , 77.33 8 33.75



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
91155
112760

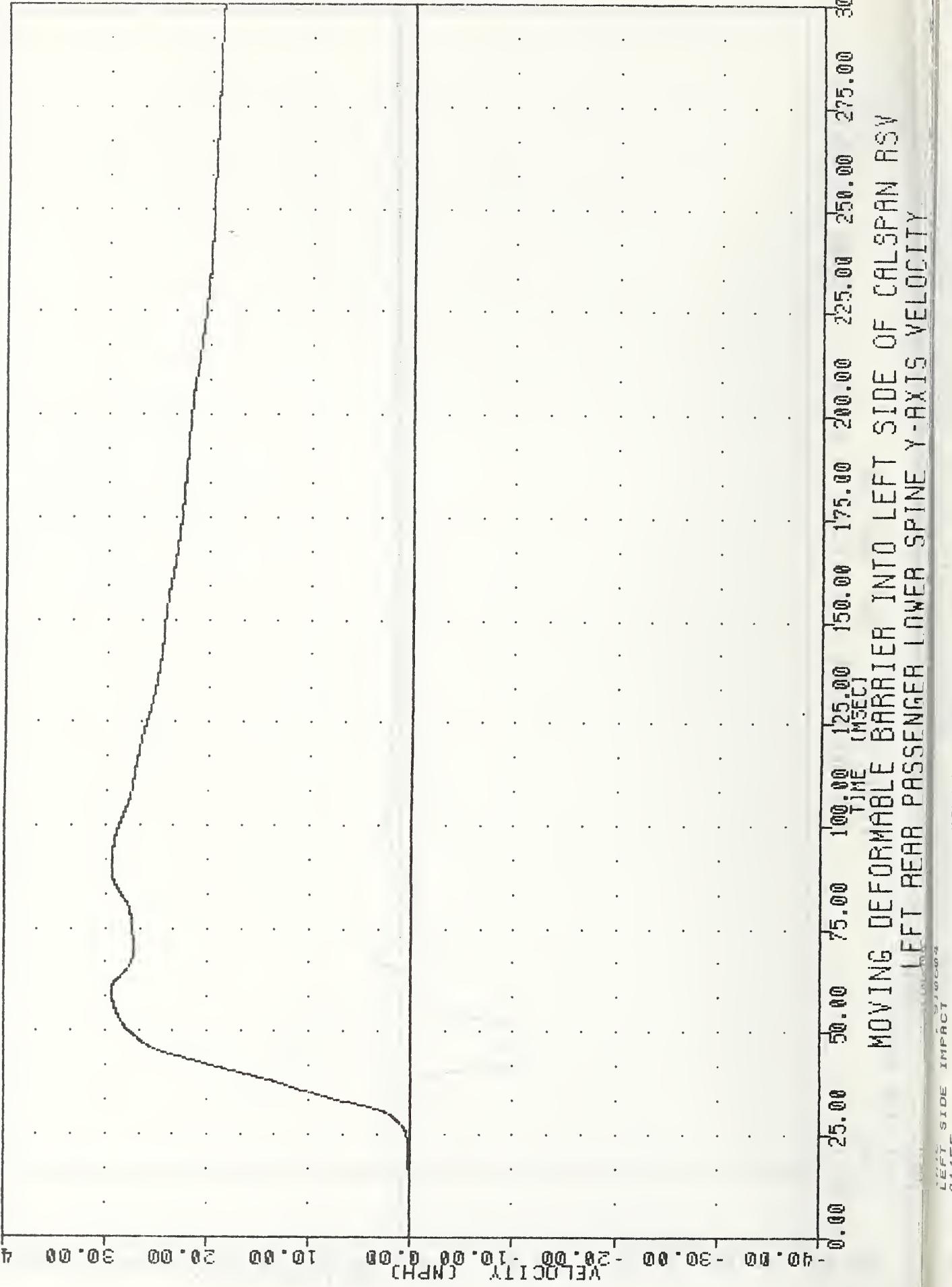
FILTER = HSRI 136/ 189/-50
MIN. MAX VALUES = -17.20 63.75 . 75.03 @ 33.75



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

YRTC • 910604
LEFT SIDE IMPACT
91155
112Y44

FILTER = RLPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.028 1.75 • 29.41 @ 90.63

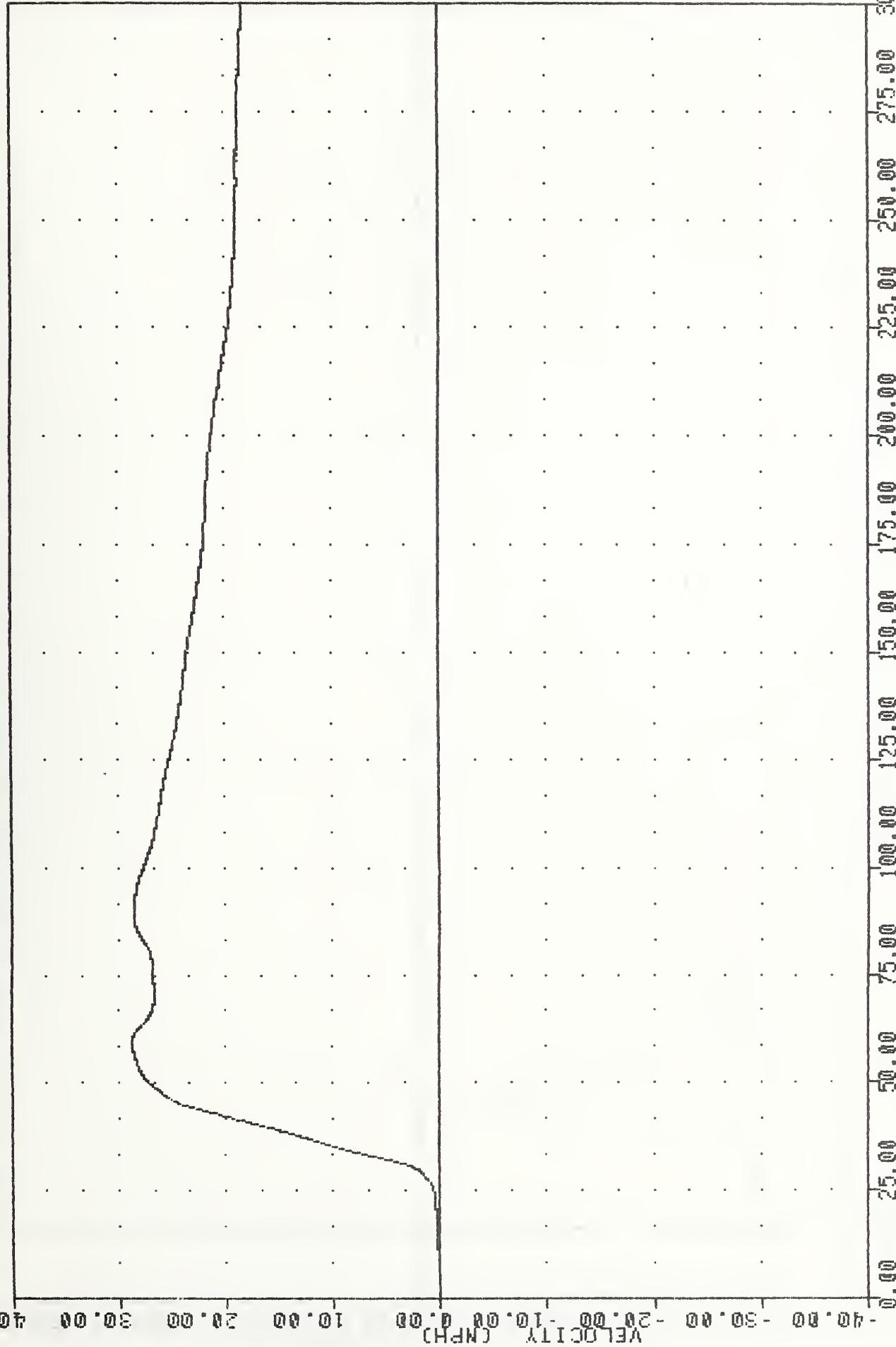


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER LOWER SPINE Y-AXIS VELOCITY

WRTC - 910604
LEFT SIDE IMPACT

91155
112700

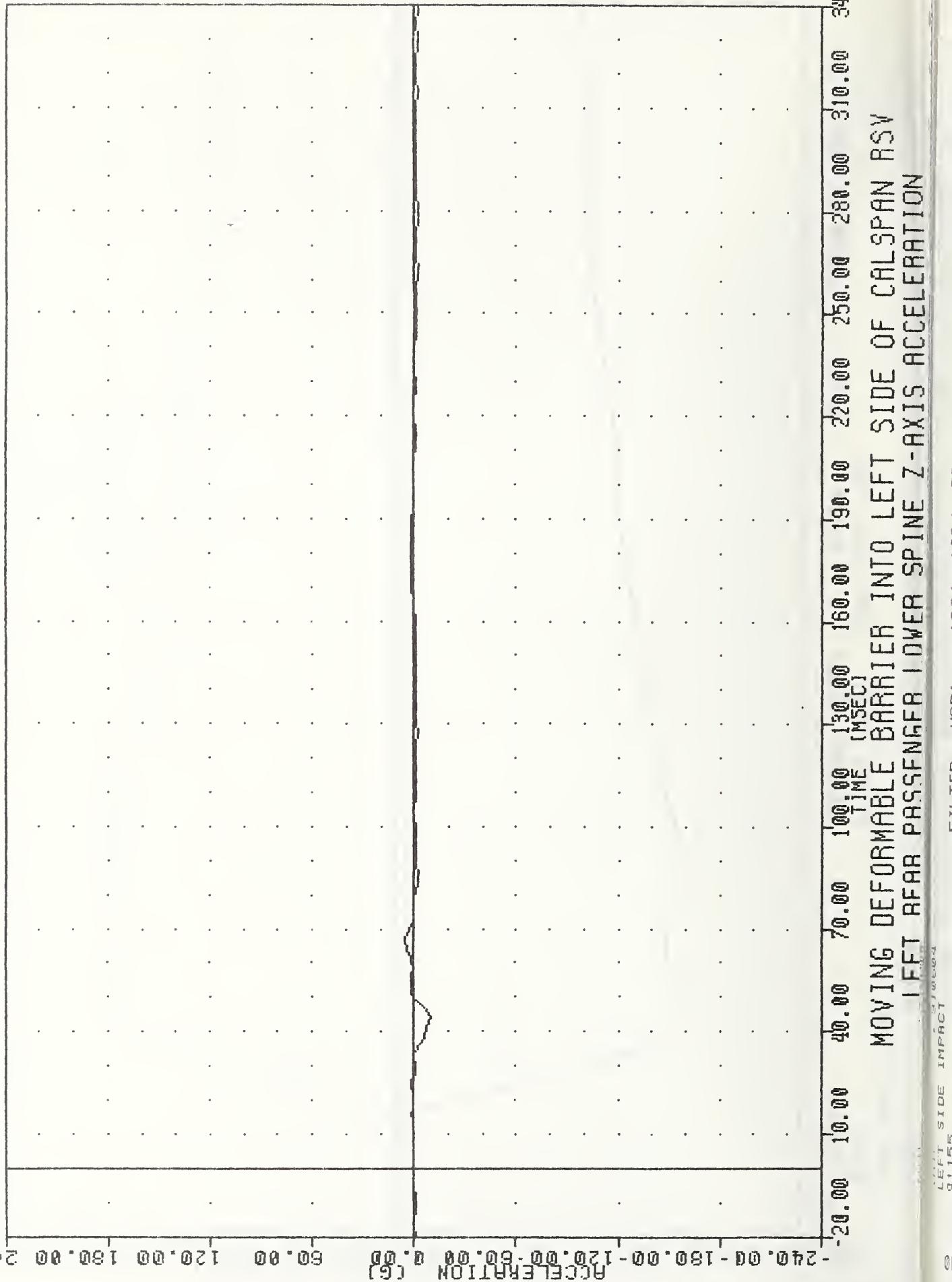
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.00e 0.25e 28.70e 58.88



VRTC , 910604
LEFT SIDE IMPACT

91155
112ZGy

FILTER = HSRI
MIN, MAX VALUES = 136/ 189/ -50
-9.468 44.38 , 5.13 & 66.25

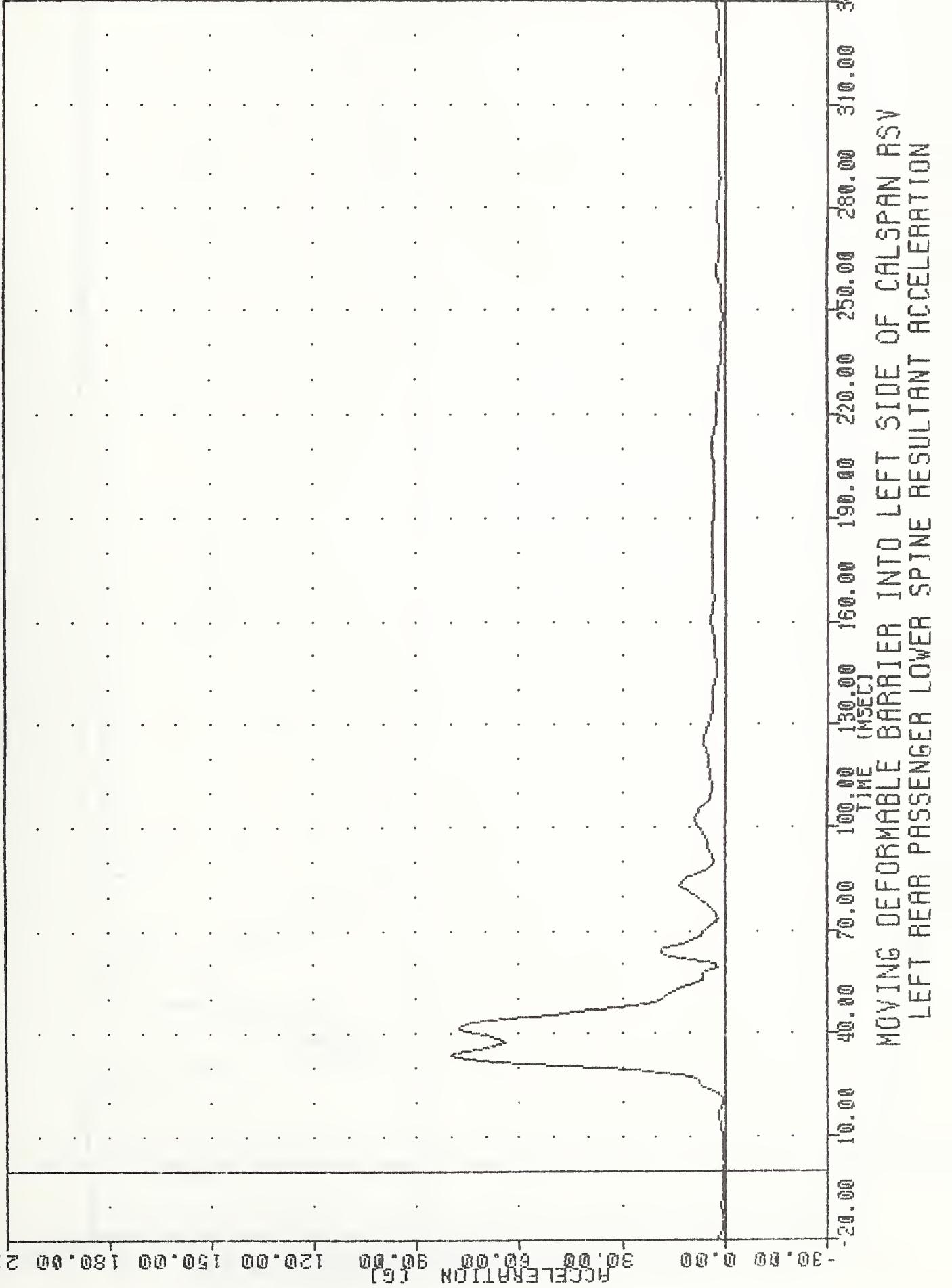


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER LOWER SPINE ACCELERATION

WRTC 910604
LEFT SIDE IMPACT

91155
T12R64

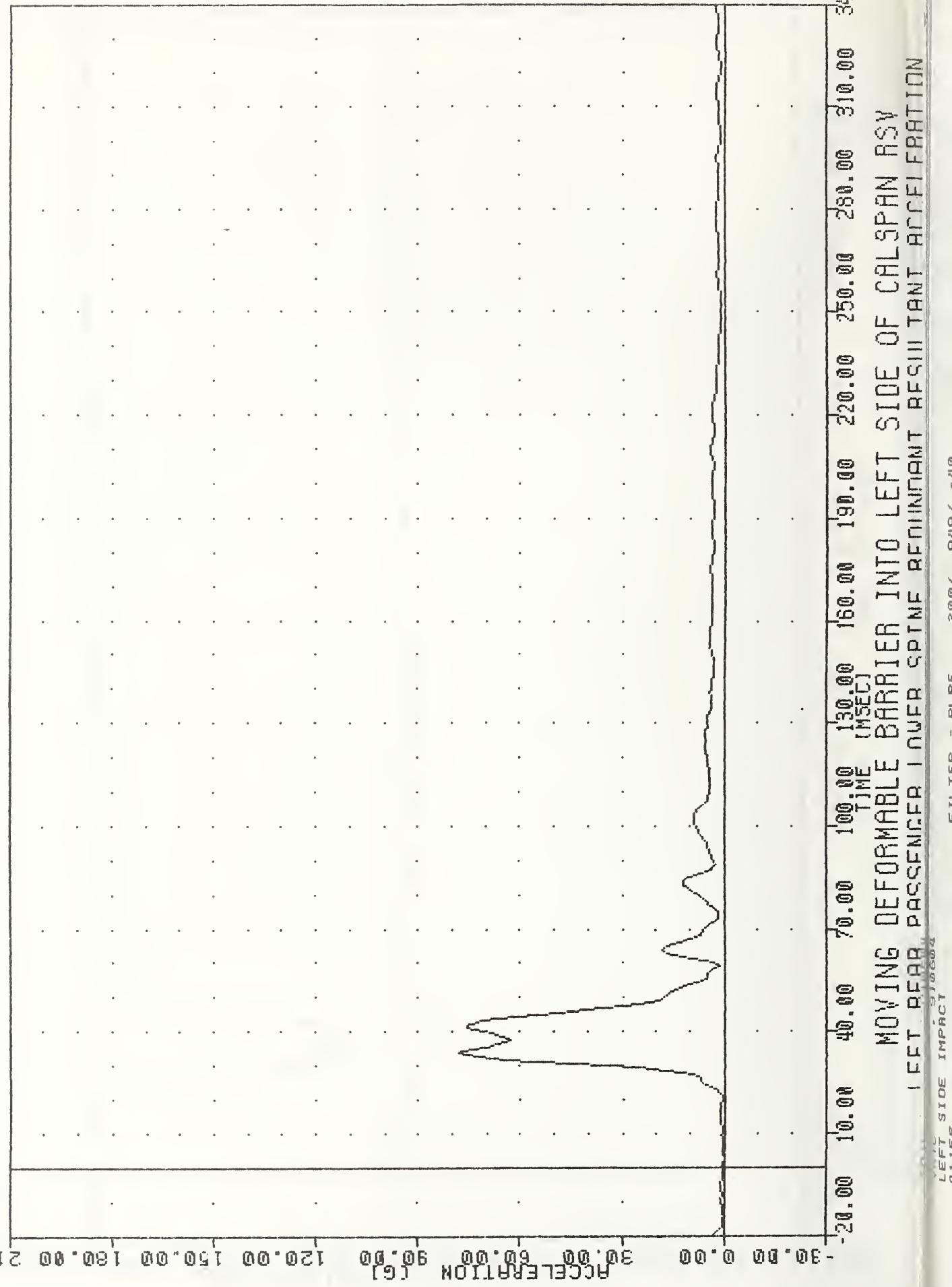
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = 0.082 -14.37 - 80.06 0 33.75



YRTC
LEFT SIDE IMPACT

91155
112RG0

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = 0.118 2.50 . 77.84 e 33.75



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT BEAM PASSENGER TAKKED OUT THE REAR POSITION

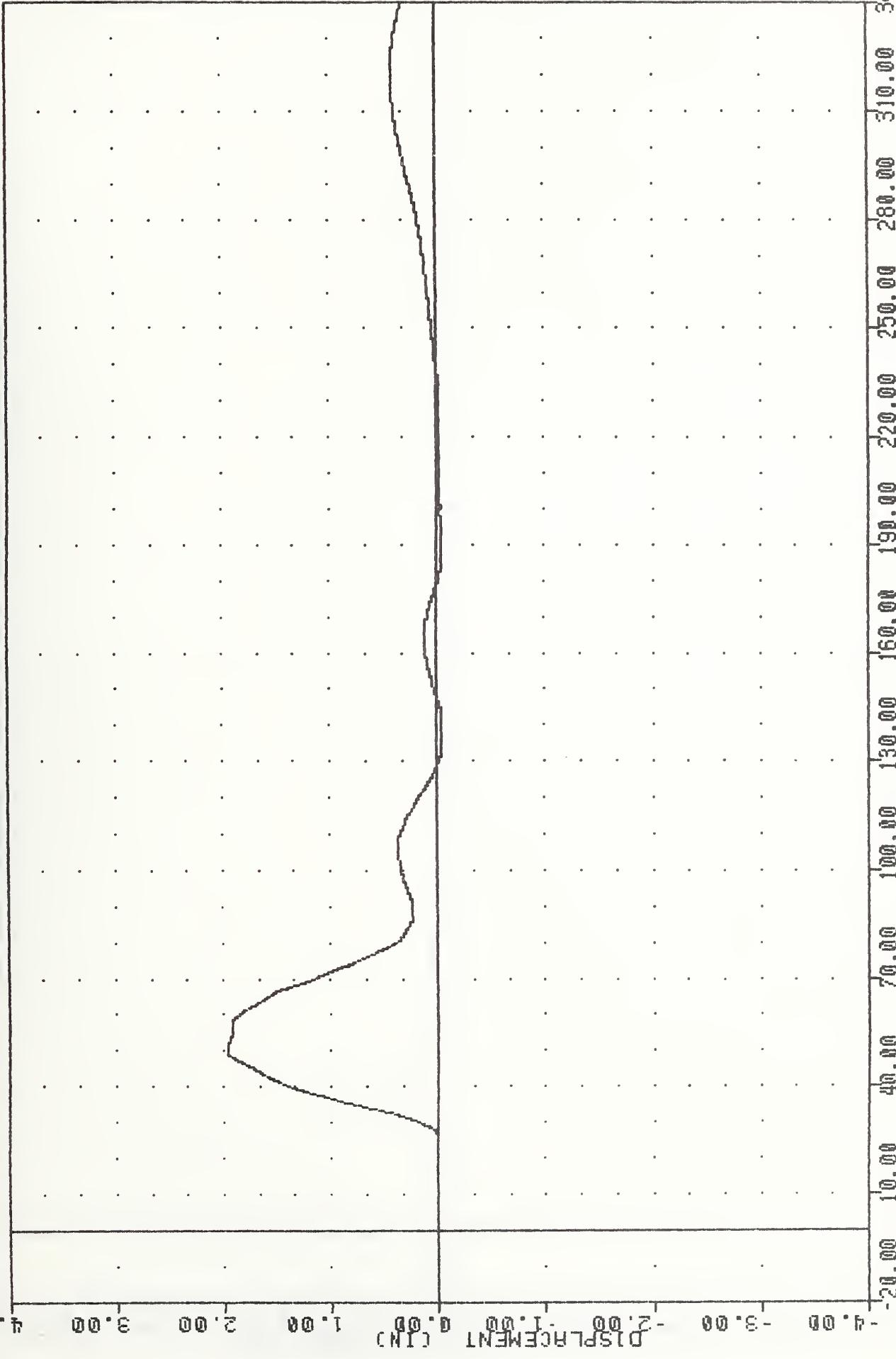
WTC 910604

LEFT SIDE IMPACT

91155
CSTY04

FILTER = BLPF 300/
MIN. MAX VALUES = -0.038 140.50 .

1.96 & 49.75

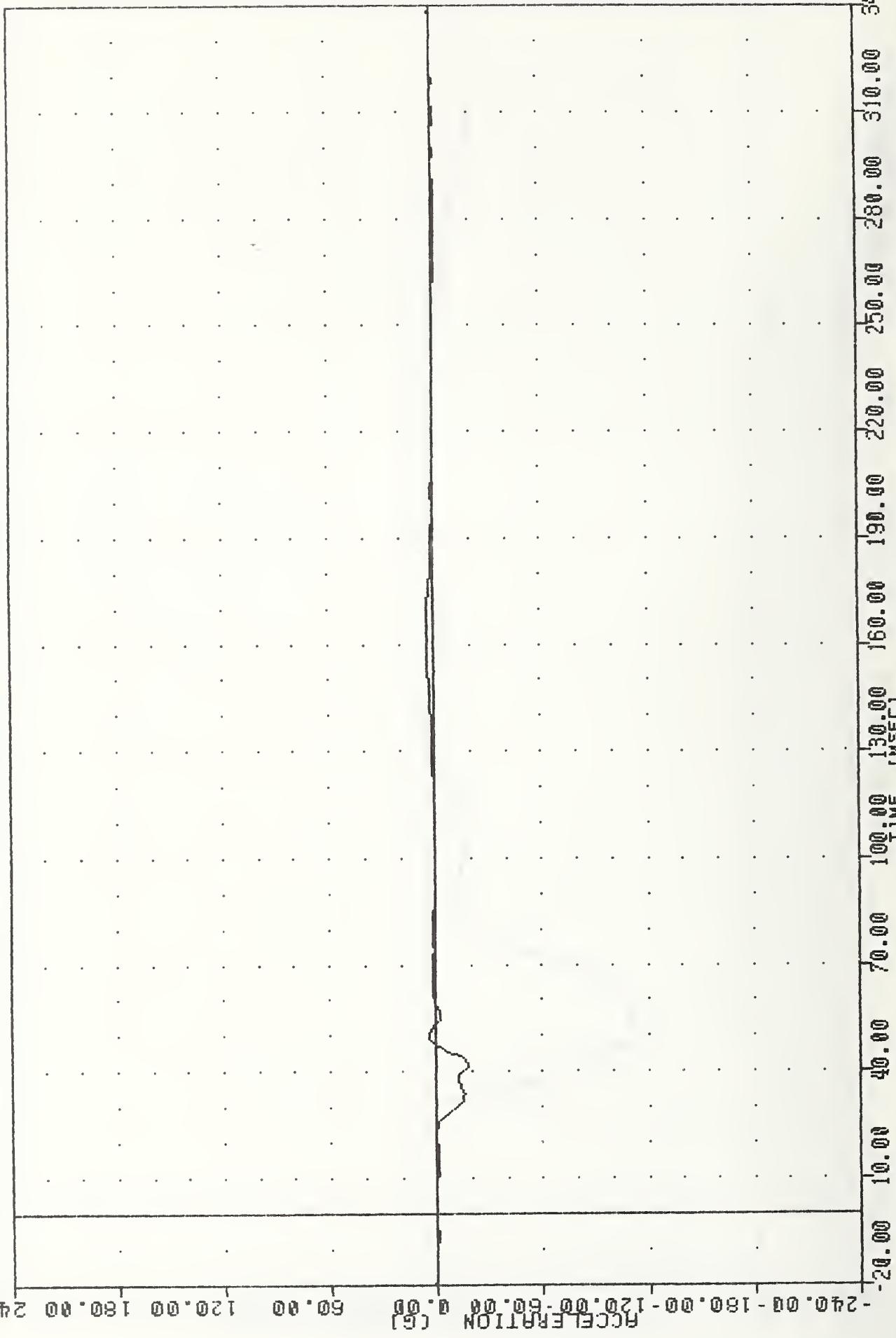


VRTC 910604

LEFT SIDE IMPACT

91155
PEVXGY

FILTER = HSRI 136/ 189/-50
MIN, MAX VALUES = -17.71@ 41.87@ 4.17@ 160.63



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER PELVIS X-AXIS ACCELERATION

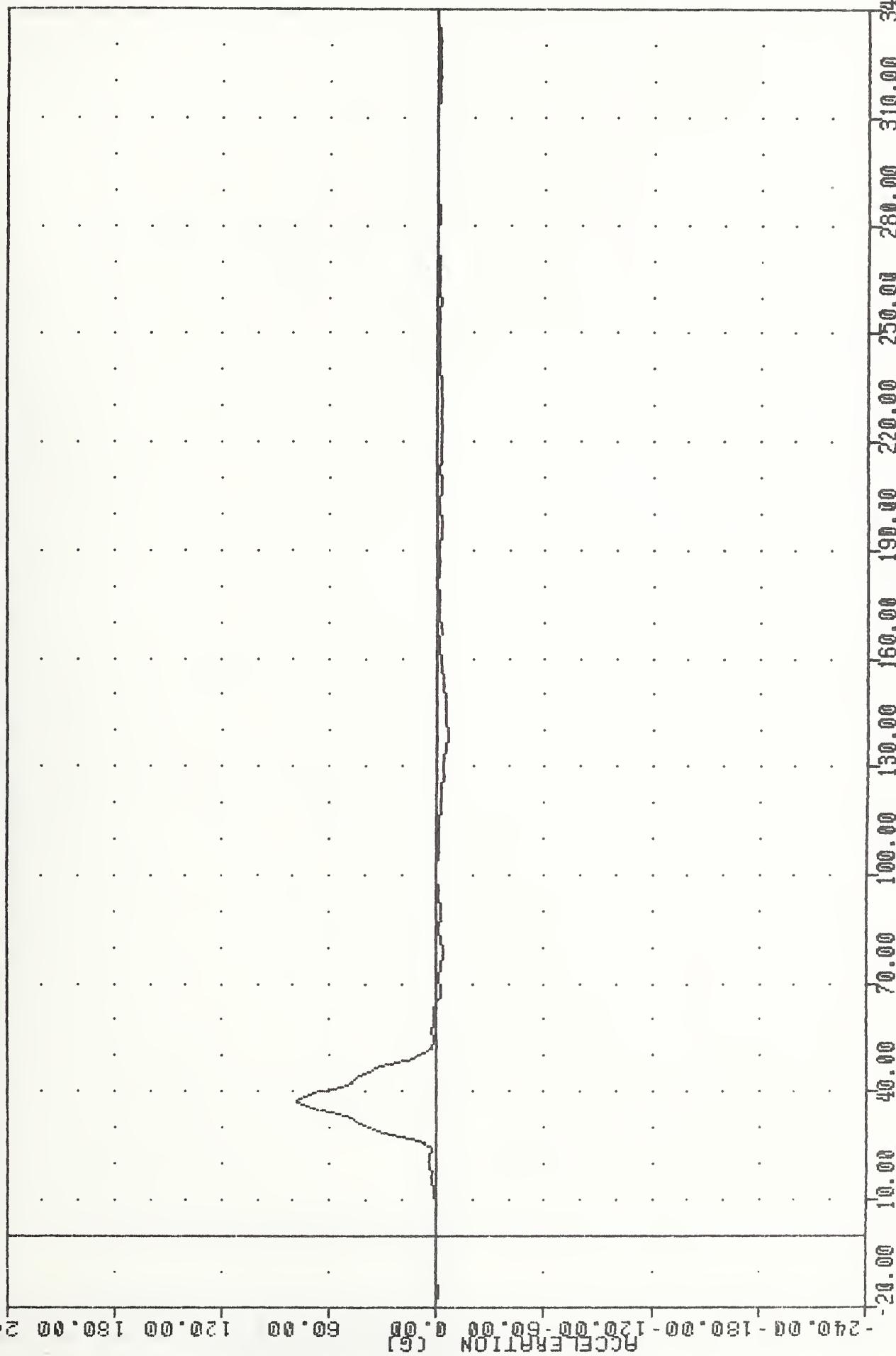
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER PELVIS X-AXIS ACCELERATION

VRTC 910604

LEFT SIDE IMPACT

91155
PEW34

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -5.688 138.13 • 78.16 • 37.50

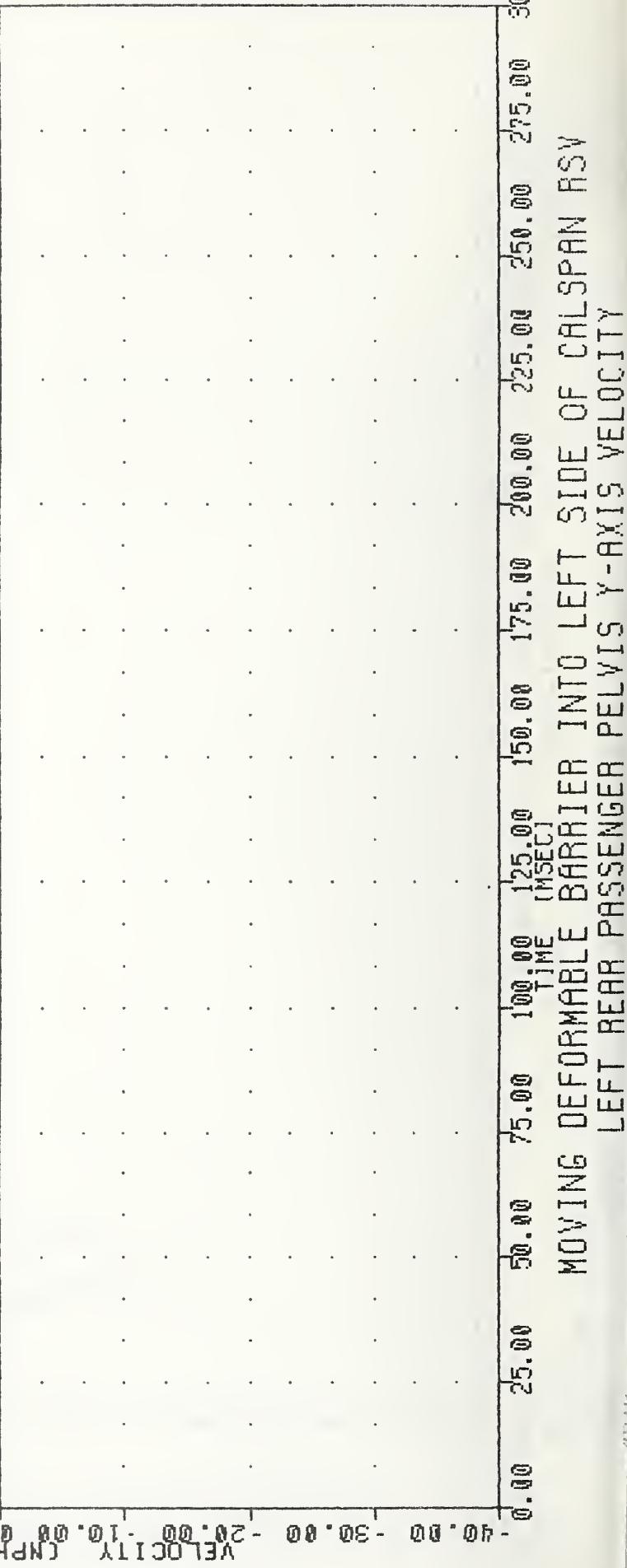
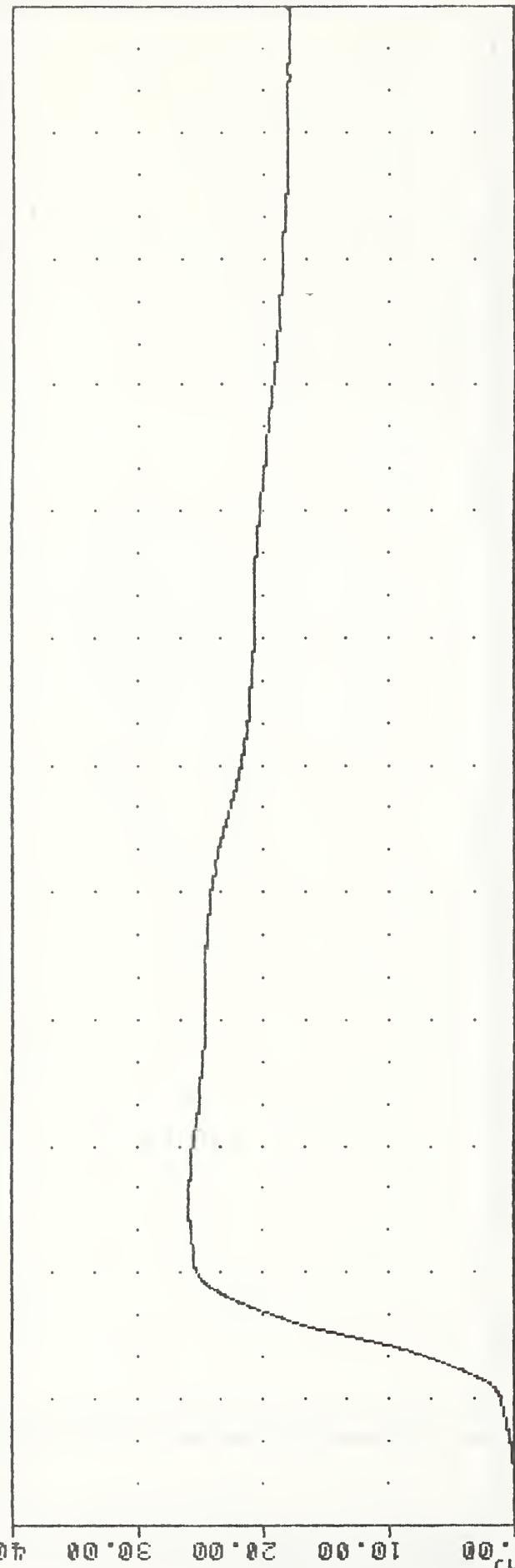


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
91155

PEWBY

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.000 e 1.25 e 25.97 e 64.50



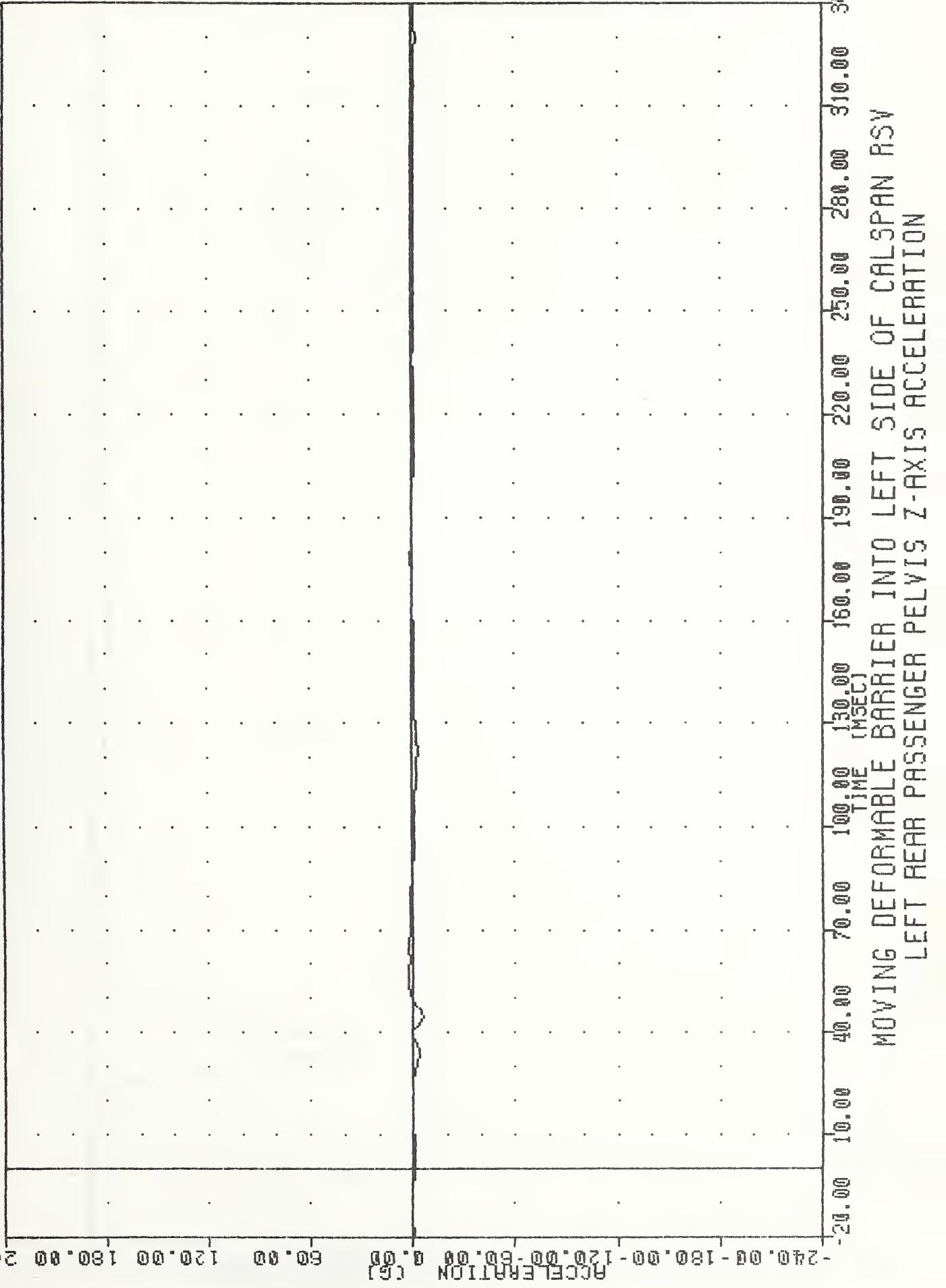
MOVING DEFORMABLE BARRIER INTO LEFT REAR PASSENGER PELVIS Y-AXIS VELOCITY

WRTC 910604
LEFT SIDE IMPACT

91155
PEYZG4

FILTER = HSRI 136/
MIN. MAX VALUES = -5.718 44.38 .

3.32 8 65.63

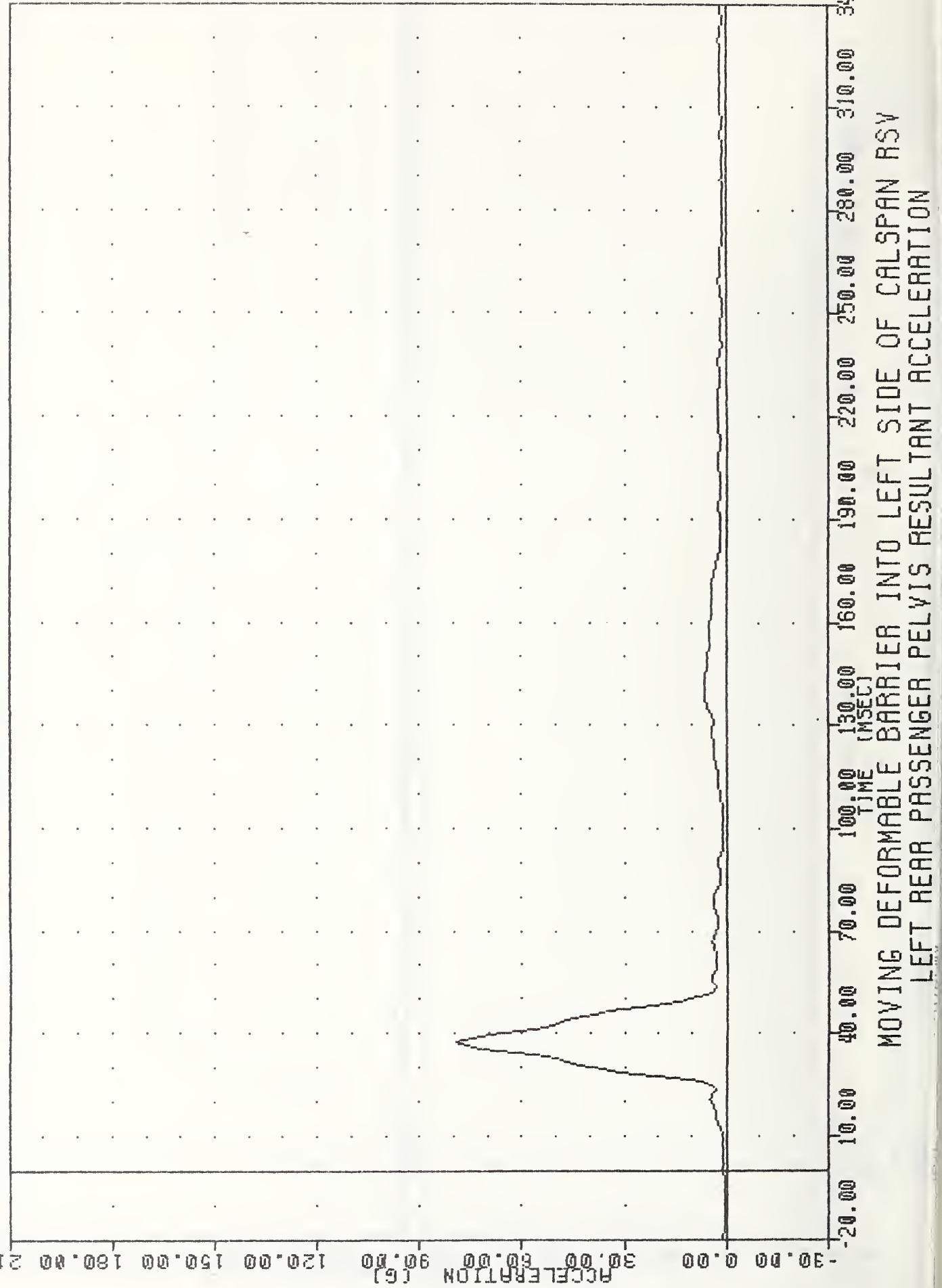


YRTC , 910604

LEFT SIDE IMPACT

91155
PEVR64

FILTER = HSRI 136/
MIN, MAX VALUES = 0.268 -4.39 - 79.14 & 37.50

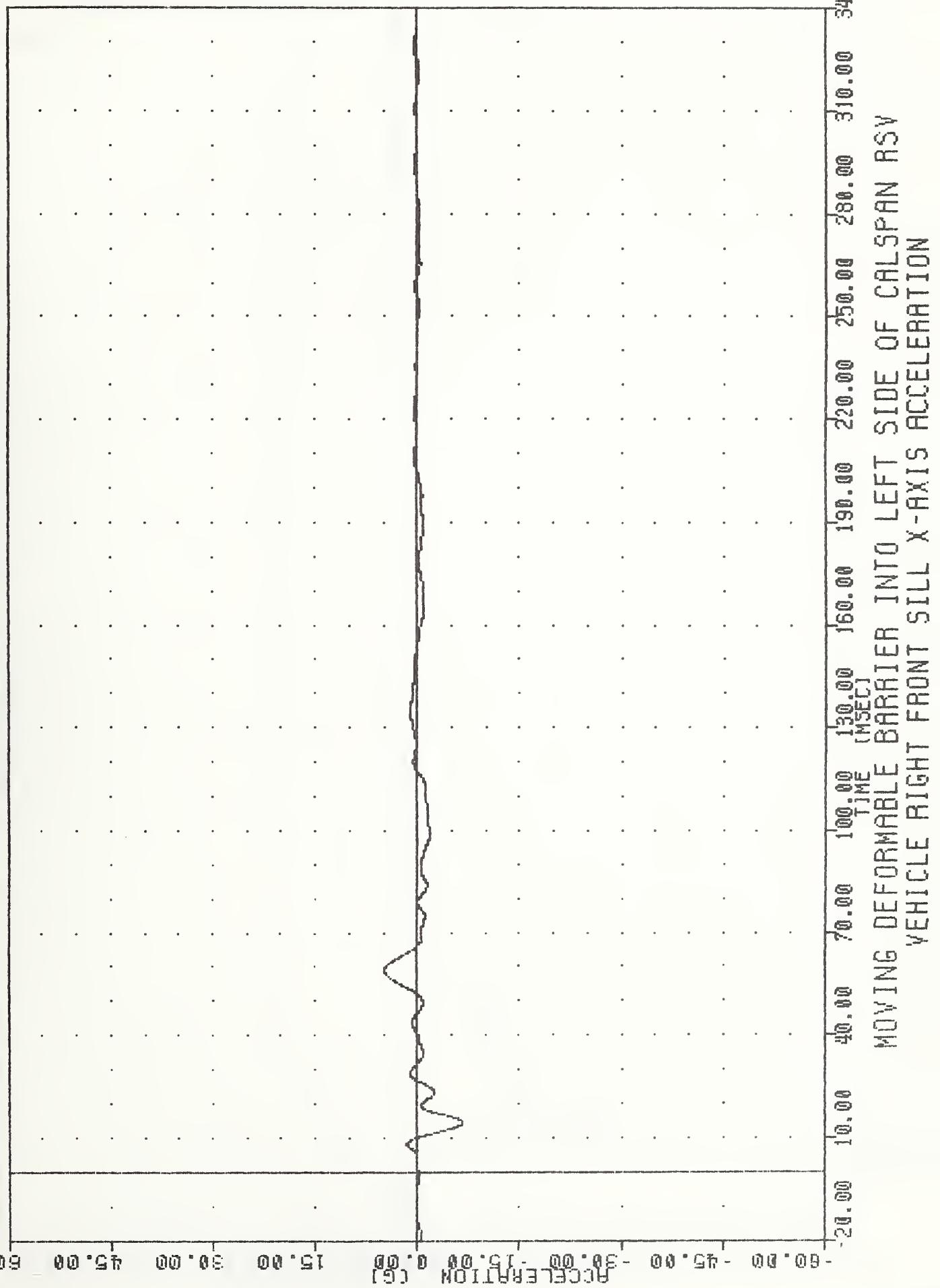


910604
LEFT SIDE IMPACT

91155
AFSX6

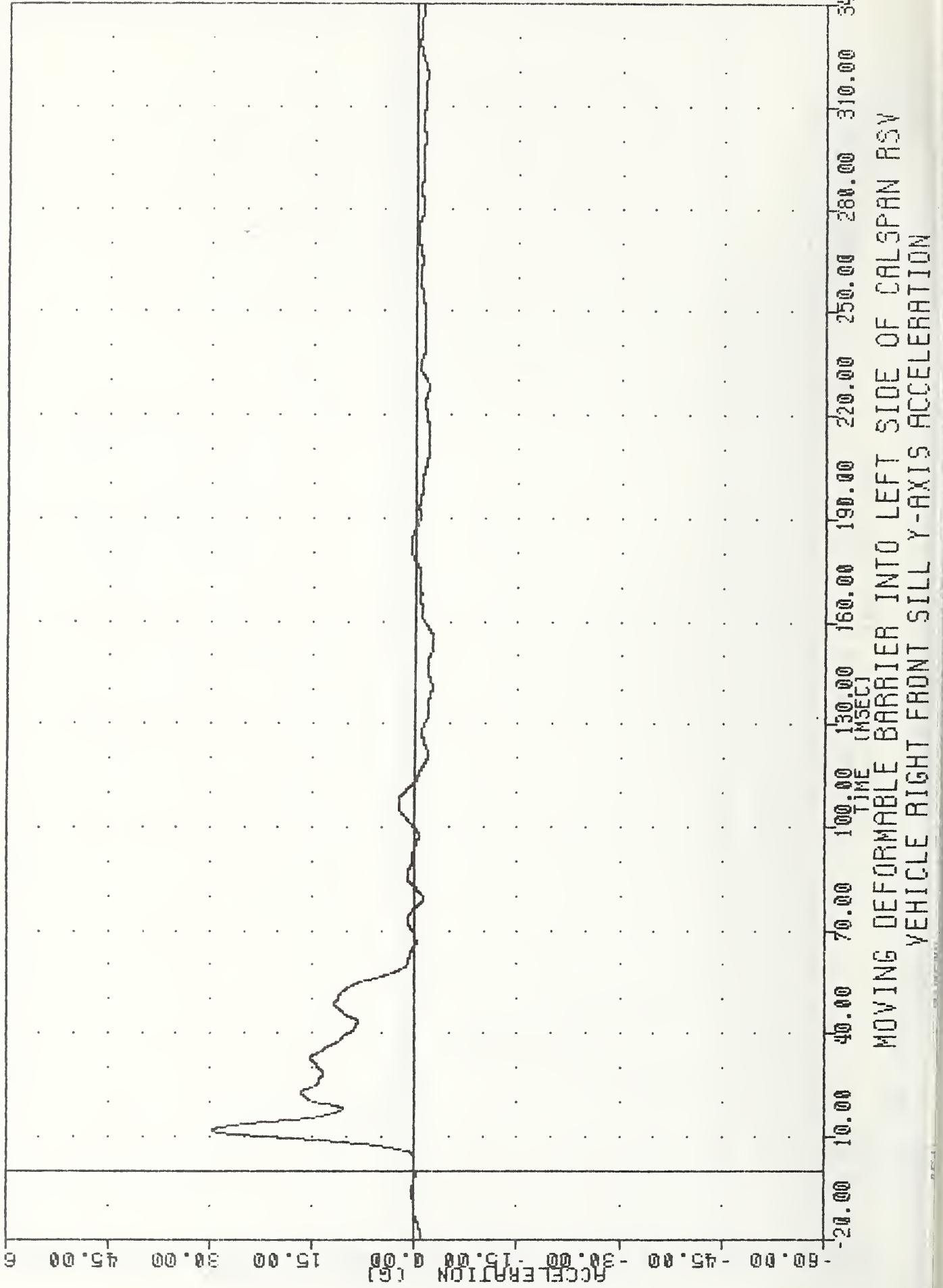
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -6.67@ 14.50 ,

4.79 @ 58.88



VRTC
LEFT SIDE IMPACT
91155
RFSY6

FILTER = BLRF 100/ 316/-40
MIN, MAX VALUES = -2.61@ 153.75 .
29.57 @ 111.75



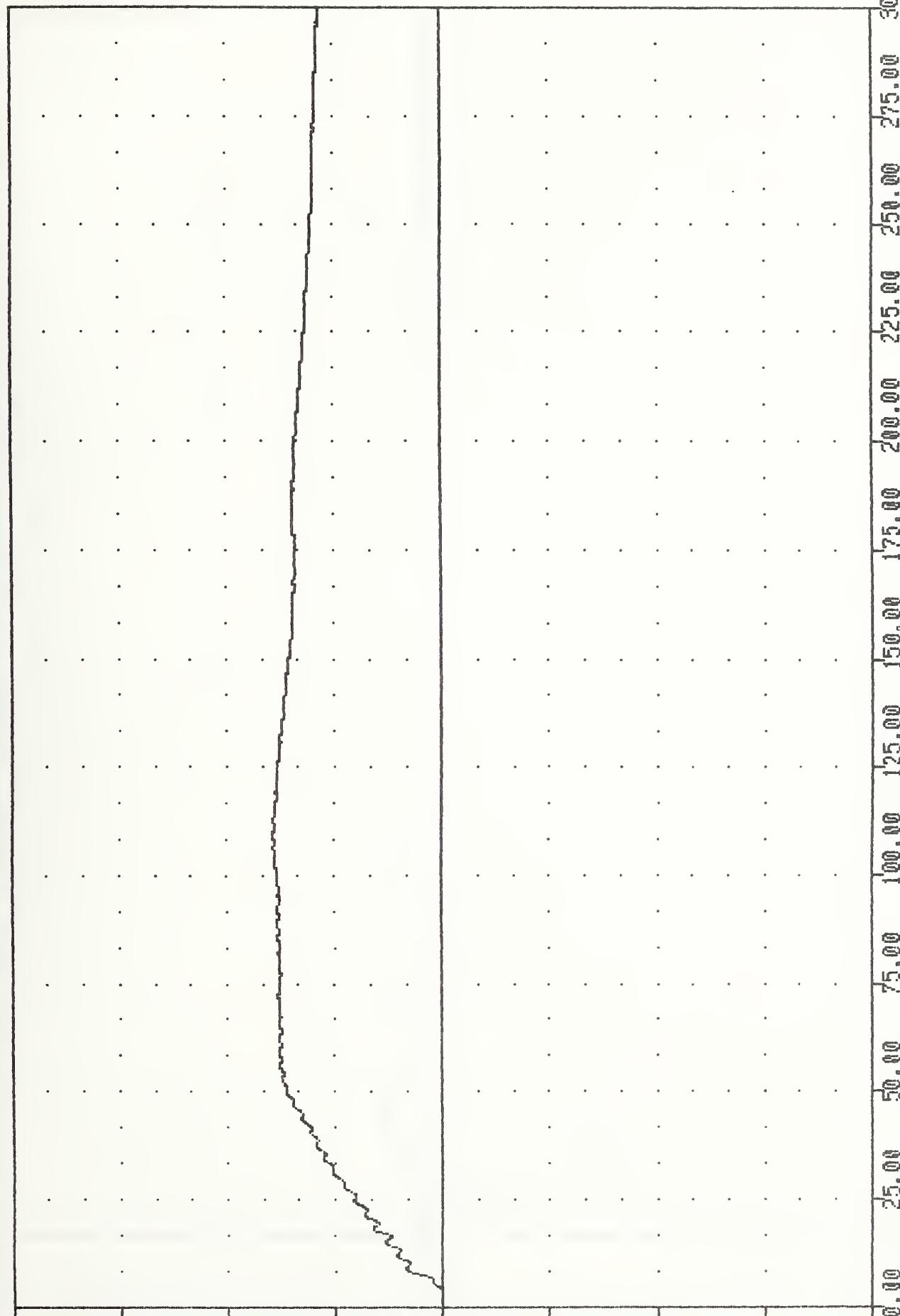
VEHICLE RIGHT FRONT SILL Y-AXIS VELOCITY
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CARSPAN RSV

MIN, MAX VALUES = 0.00 e 109.00

FILTER = ALEF 1650/ 5214/-40

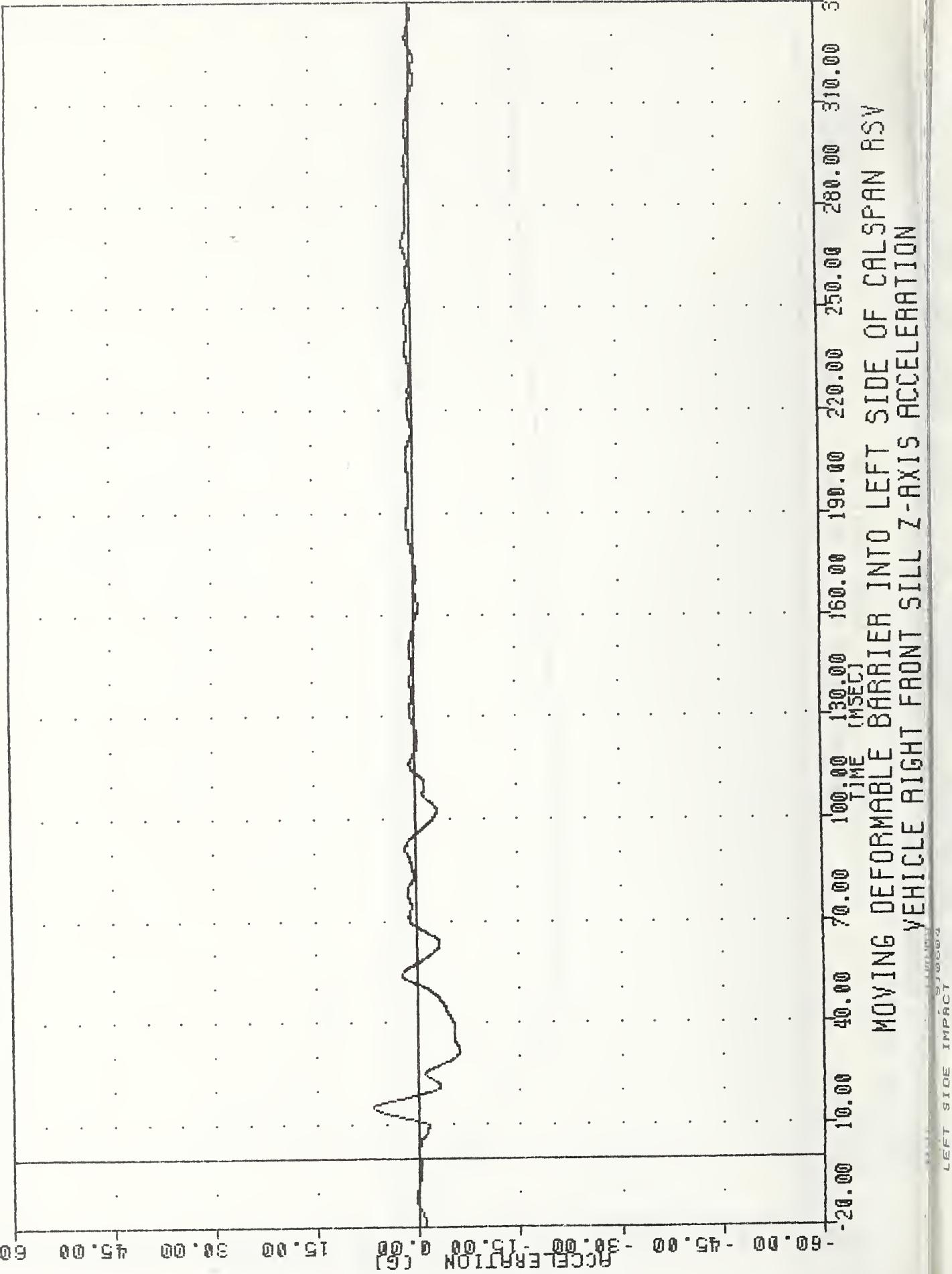
AFSYW
916004
LEFT SIDE IMPACT
91155

VELOCITY (INPH) -40.00 -30.00 -20.00 -10.00 10.00 20.00 30.00 40.00



YRTC 910604
LEFT SIDE IMPACT
91155
RFSIG

FILTER = BLPF 100/ 316/-40
MIN, MAX VALUES = -6.038 32.25
6.90 0 15.00



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CHASIS RSV
VEHICLE RIGHT FRONT SILL Z-AXIS ACCELERATION

YRTC : 910604
LEFT SIDE IMPACT
91155
AFSRG

FILTER = BLPF 100/ 316/-40
MIN, MAX VALUES = 0.018 2.00
29.79 e 11.88

0.00

10.00

20.00

30.00

40.00

50.00

60.00

70.00

0.00

10.00

20.00

30.00

40.00

50.00

60.00

70.00

80.00

90.00

100.00

110.00

120.00

130.00

140.00

150.00

160.00

170.00

180.00

190.00

200.00

210.00

220.00

230.00

240.00

250.00

260.00

270.00

280.00

290.00

300.00

310.00

320.00

330.00

340.00

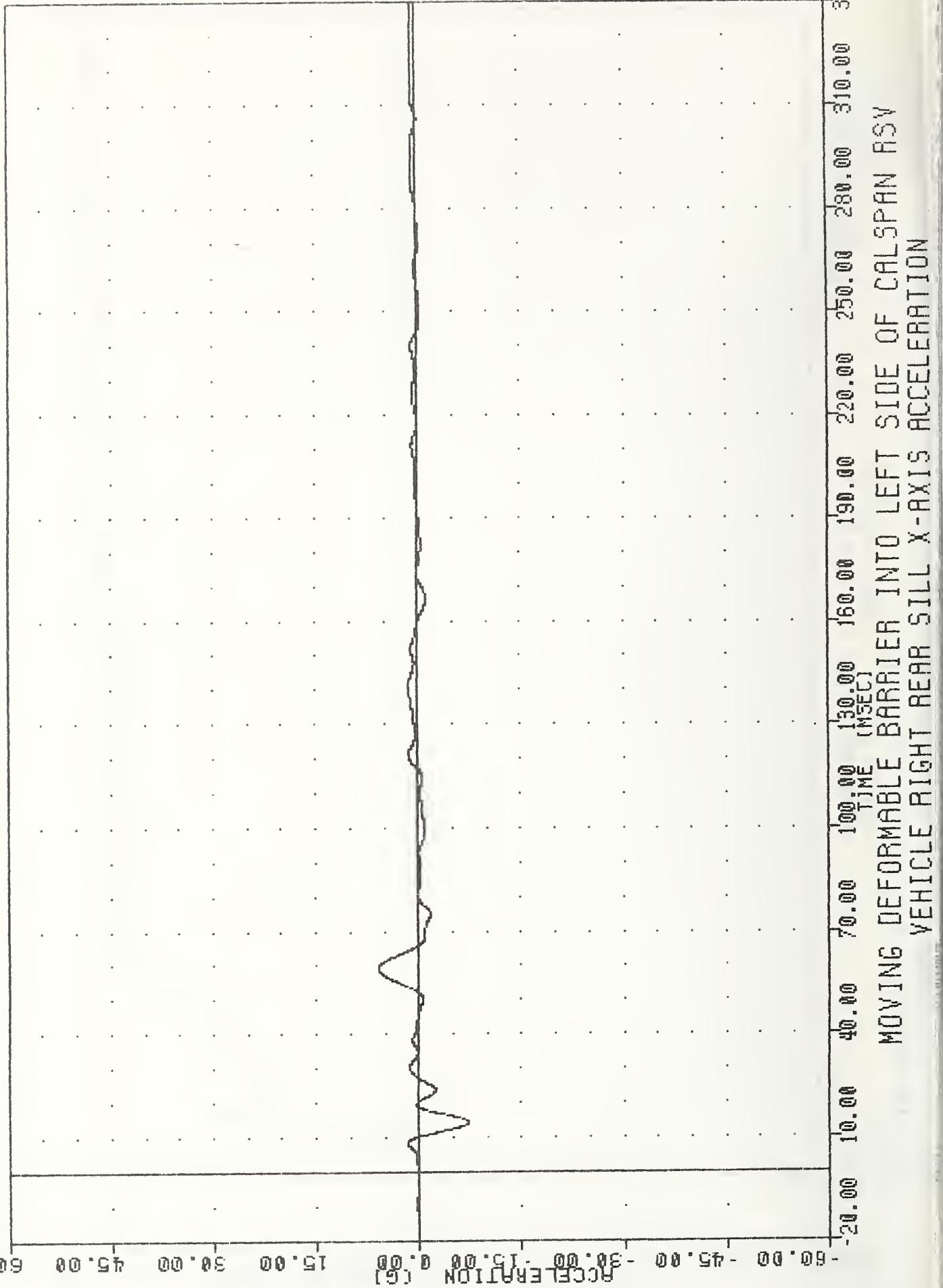
ACCELERATION (G)

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
VEHICLE RIGHT FRONT SILL RESULTANT ACCELERATION

TIME
(MSEC)

VRTC : 910604
LEFT SIDE IMPACT
91155
RSXG

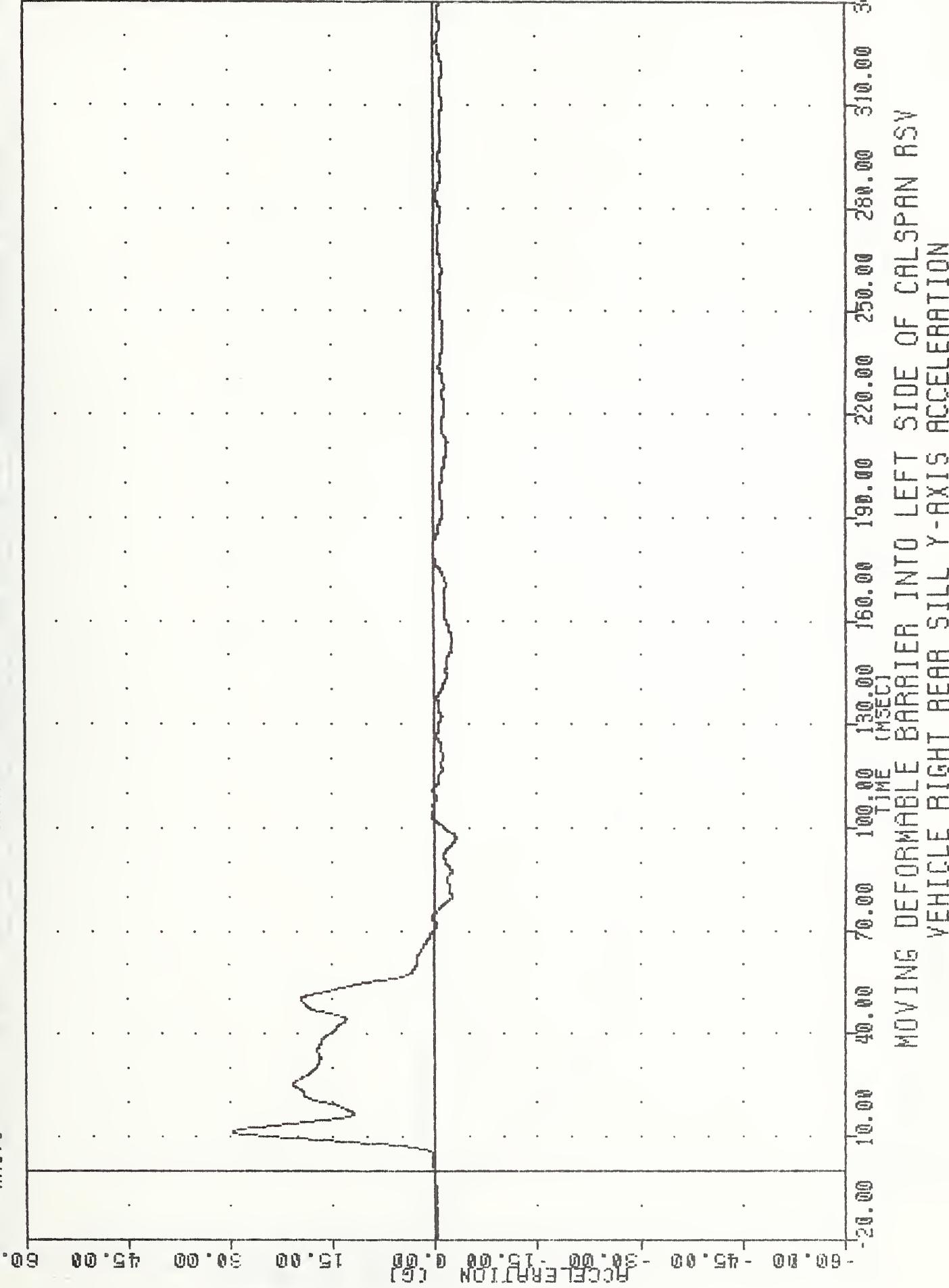
FILTER = BLPF 100/ 316 / -40
MIN. MAX VALUES = -7.26@ 14.25@ 5.85@ 59.25@



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
VEHICLE RIGHT REAR SILL X-AXIS ACCELERATION

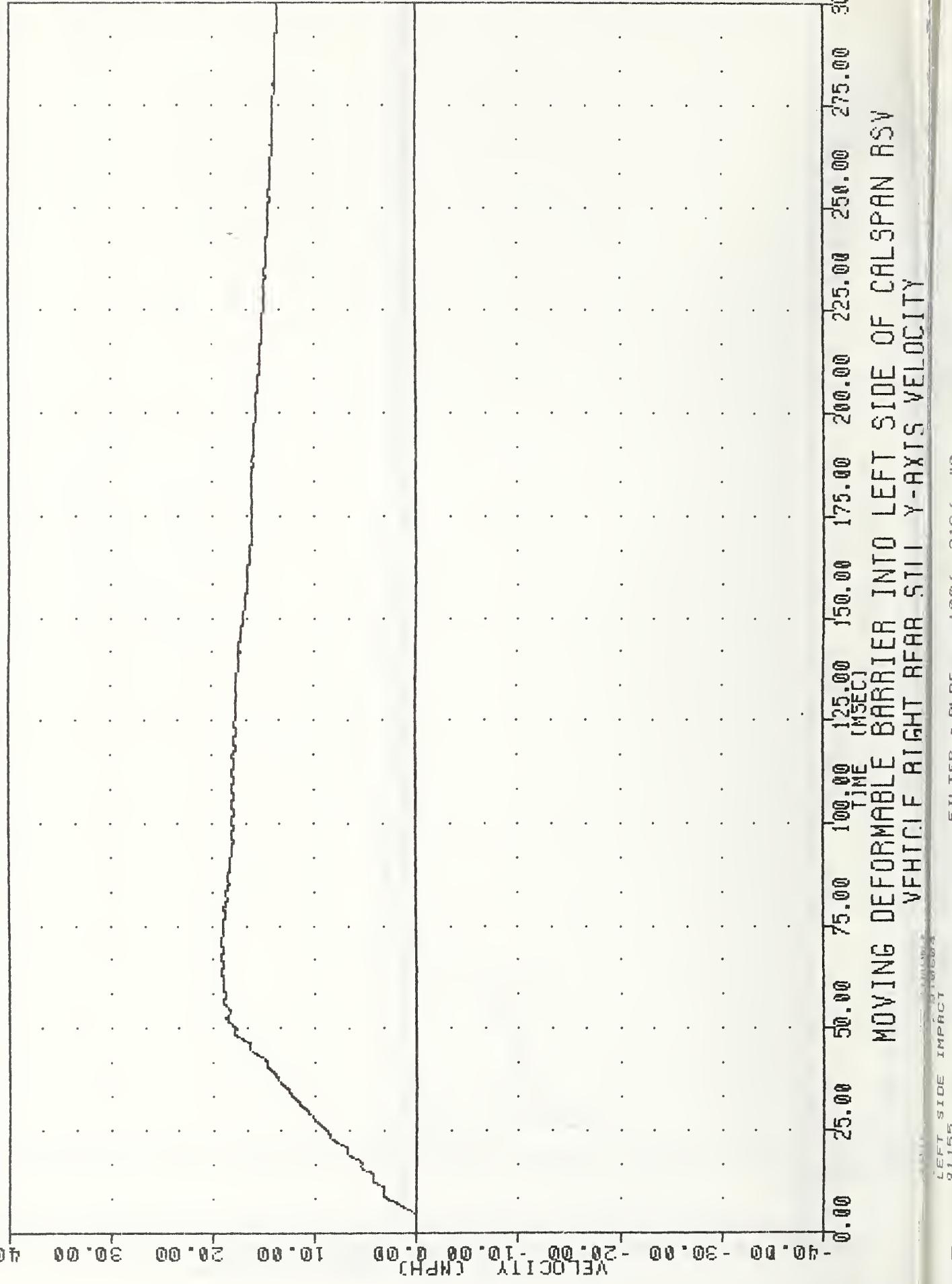
VRTC
LEFT SIDE IMPACT
91155
RSY6

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -2.968 97.13 . 29.65 & 11.38



VRTC 910604
LEFT SIDE IMPACT
91155 ARSYW

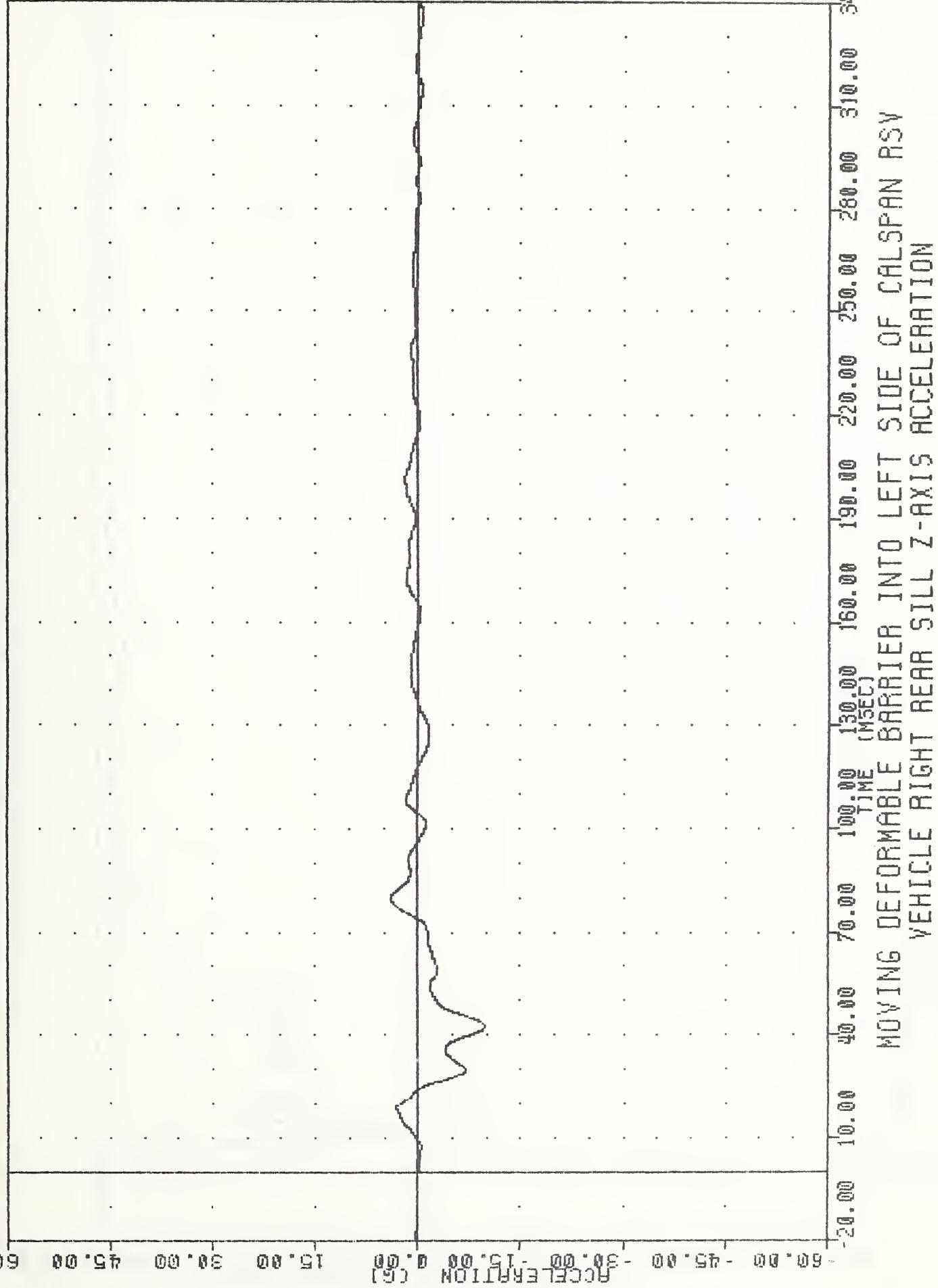
FILTER = FILPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.000 0.00 , 19.16 & 71.25



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
VEHICLE RIGHT REAR SILL Y-AXIS VELOCITY

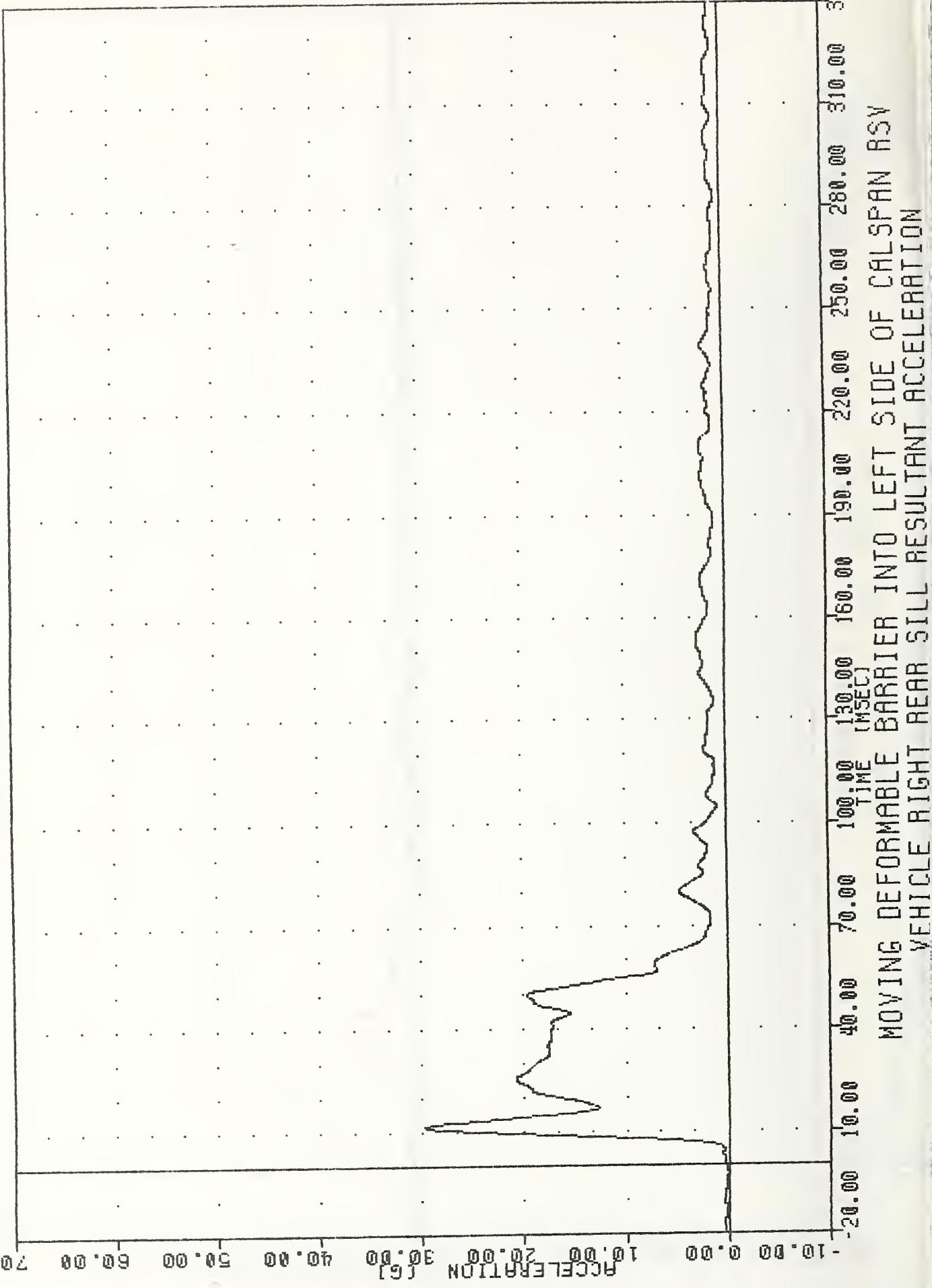
VEHICLE
LEFT SIDE IMPACT
91155
RSZG

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -9.738 42.500
3.92 @ 79.75



VRTC 910604
LEFT SIDE IMPACT
91155 ARSRG

FILTER = BLPP 100/ 316/-40
MIN, MAX VALUES = 0.028 -2.63 - 29.77 & 11.38



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
VEHICLE RIGHT REAR STILL RESULTANT ACCELERATION

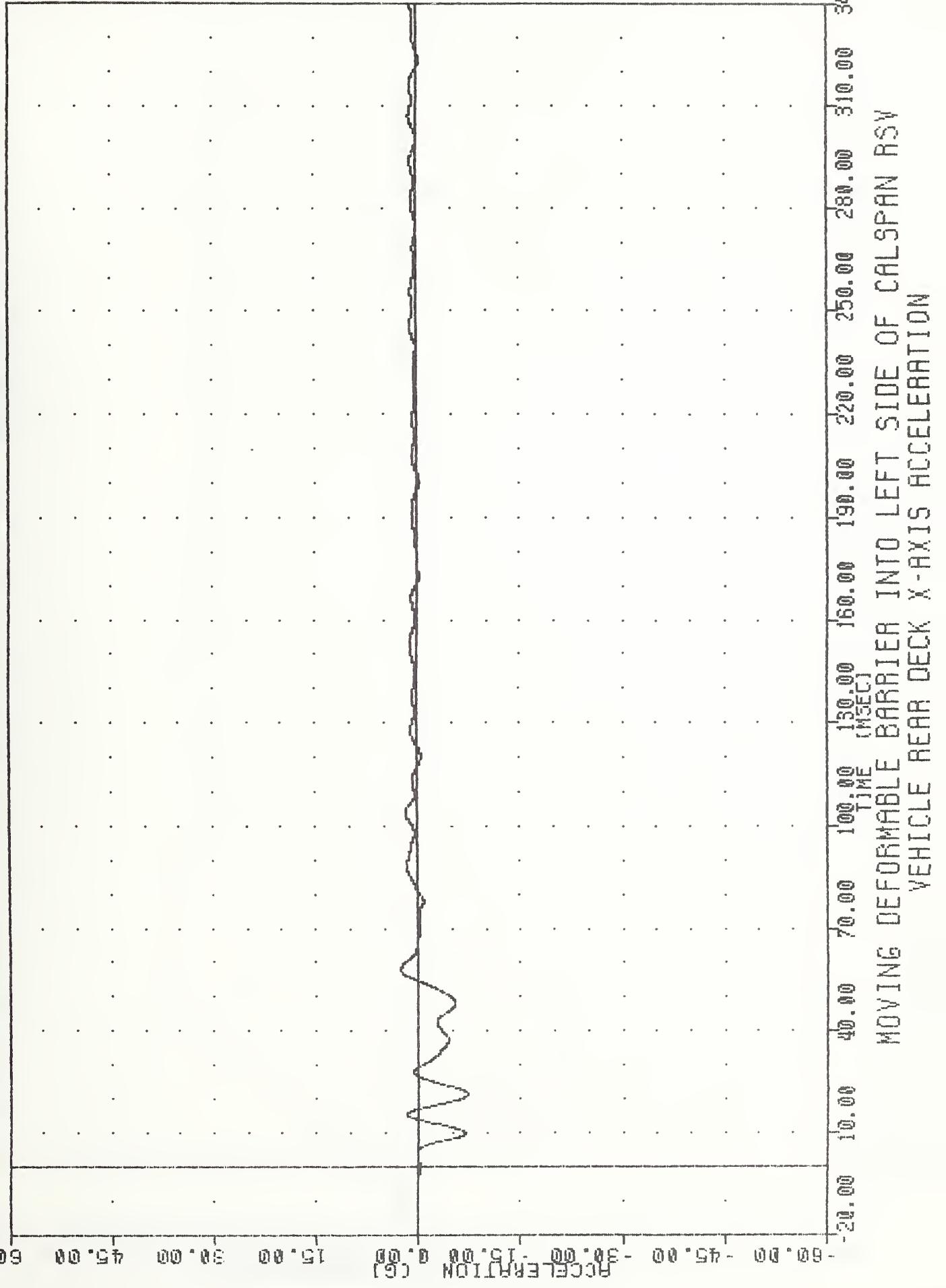
VRTC 910604

LEFT SIDE IMPACT

91155
ADKX6

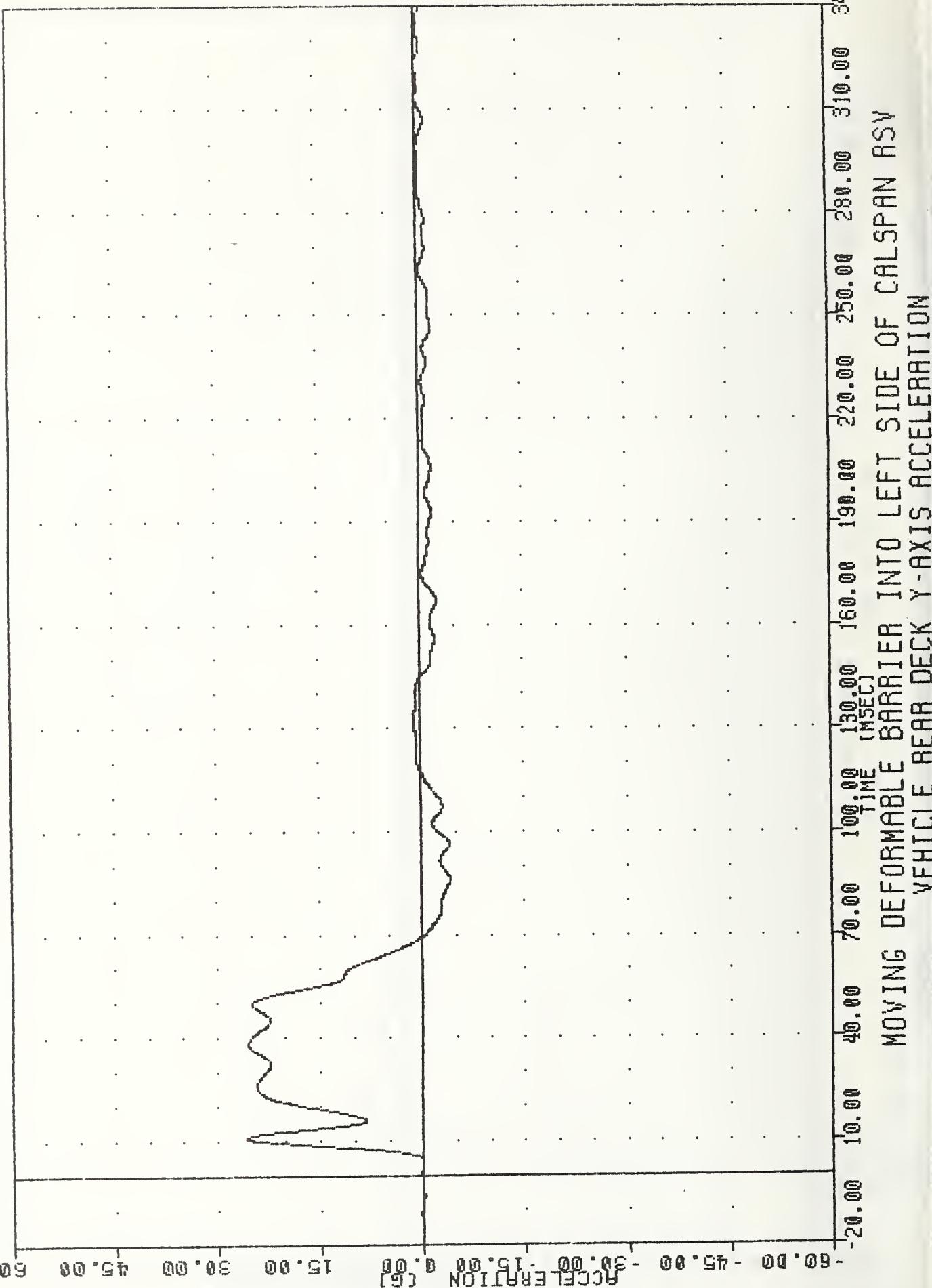
FILTER = BLPF 100/ -40
MIN. MAX VALUES = -7.268 21.38 .

2.59 6 58.00



VRTC
LEFT SIDE IMPACT
91155
ROKYG

FILTER = BLPF 100/ 316/-40
MIN. MAX VALUES = -4.068 85.75 . 25.79 @ 10.88

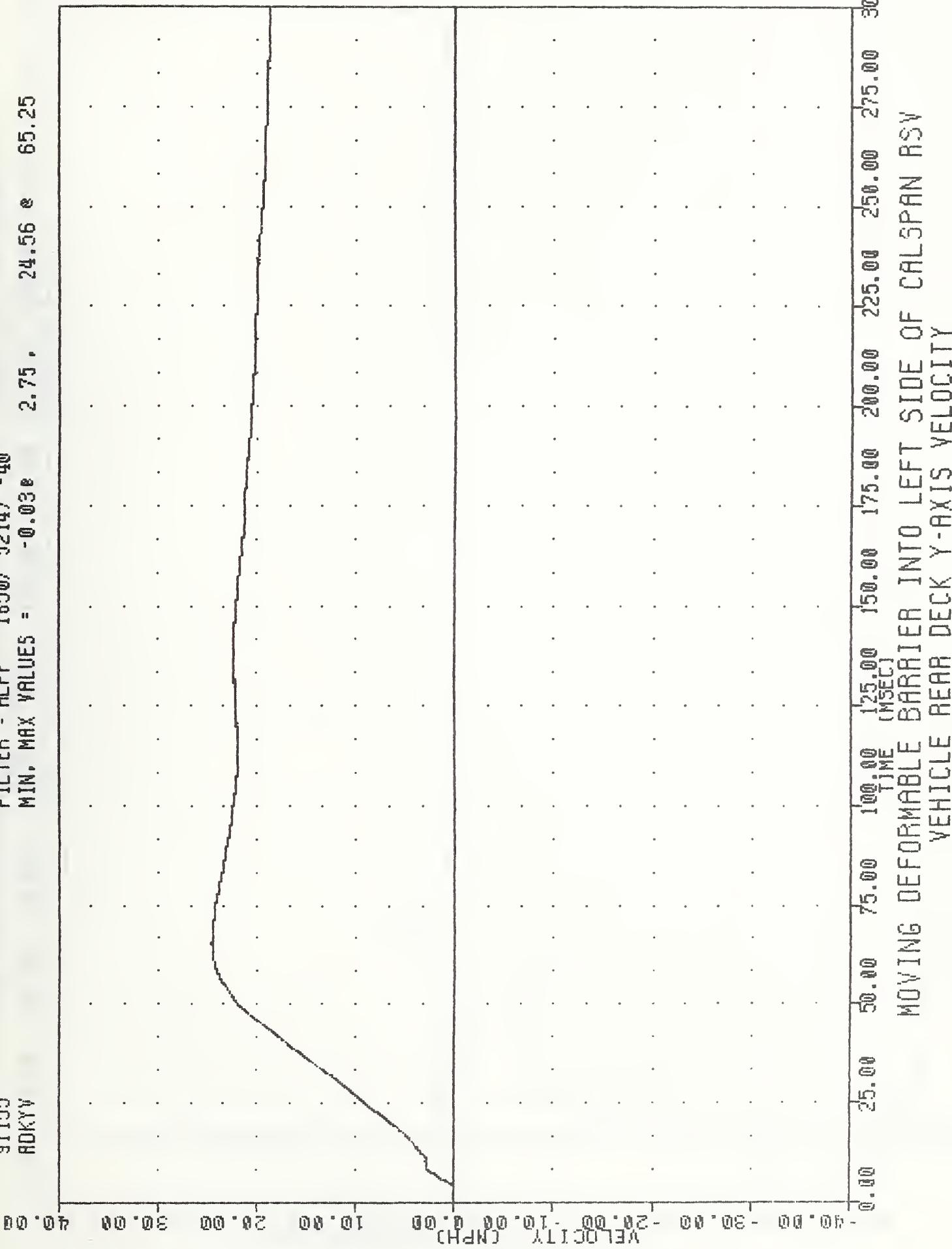


MOWING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV VEHICLE REAR DECK Y-AXIS ACCELERATION

WRTC , 910604
LEFT SIDE IMPACT

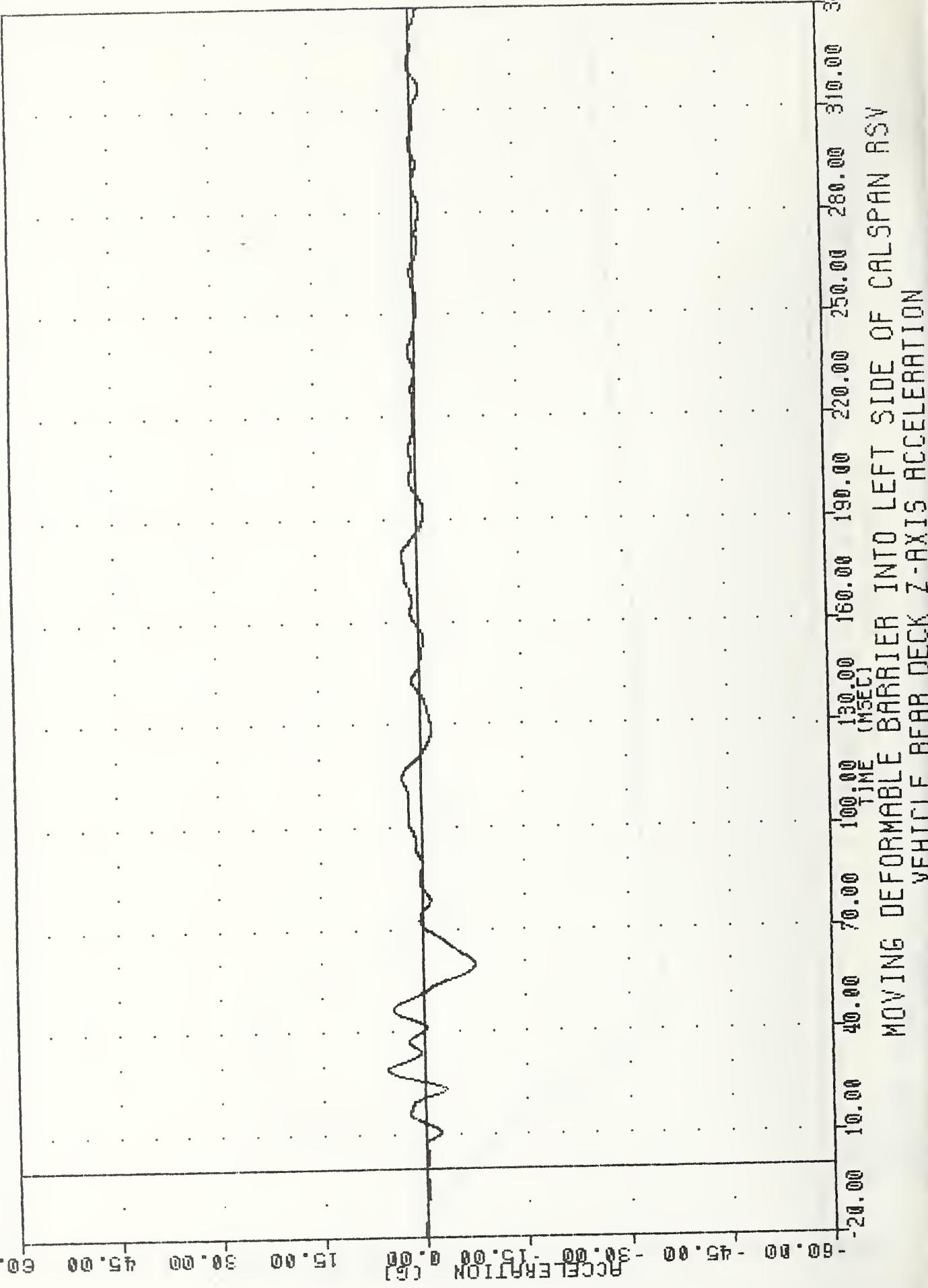
91155
RDKEY

FILTER = ALPF 1650/ 5214/-40
MIN. MAX VALUES = -0.038



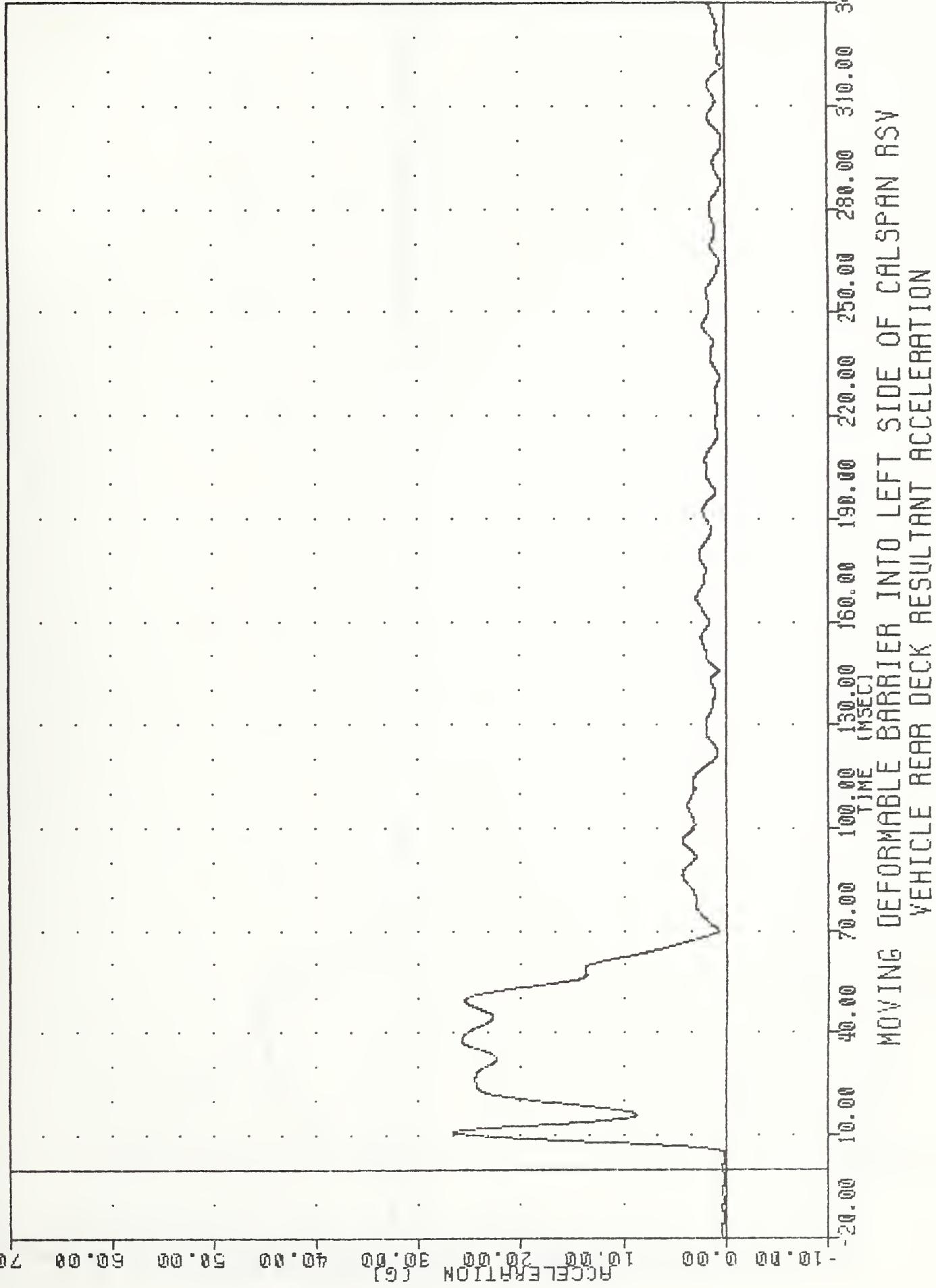
VRTC 910604
LEFT SIDE IMPACT
91155
ADKIG

FILTER = BLPF 100/ 316/-40
MIN. MAX VALUES = -7.538 59.504
5.508 28.88



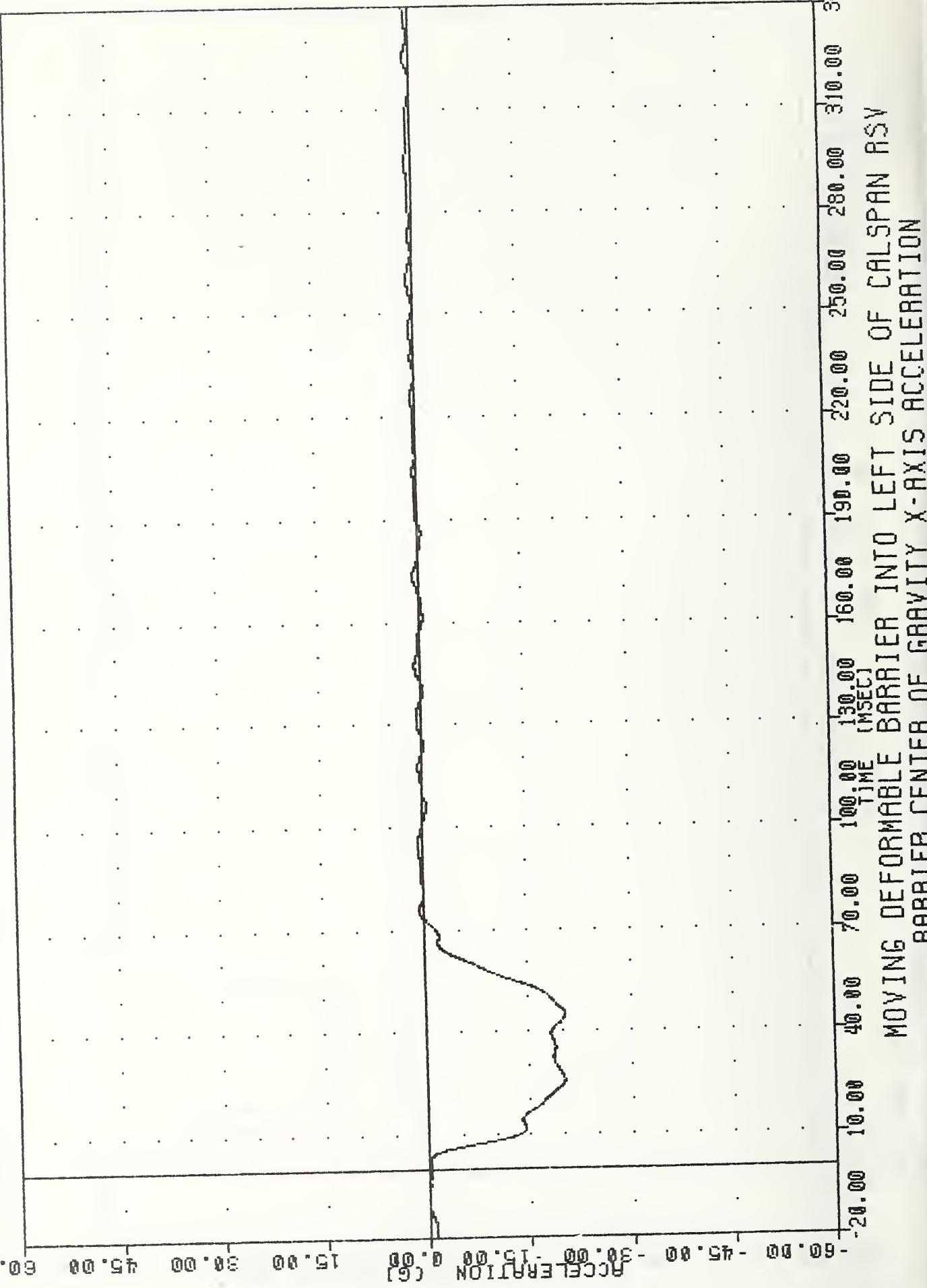
910604
91155
ADKRG
VRTC
LEFT SIDE IMPACT

FILTER = BLPF 100/
MIN, MAX VALUES = 0.078 -3.13 , 26.57 @ 10.88



YRTC 910604
LEFT SIDE IMPACT
91155 BCGX6

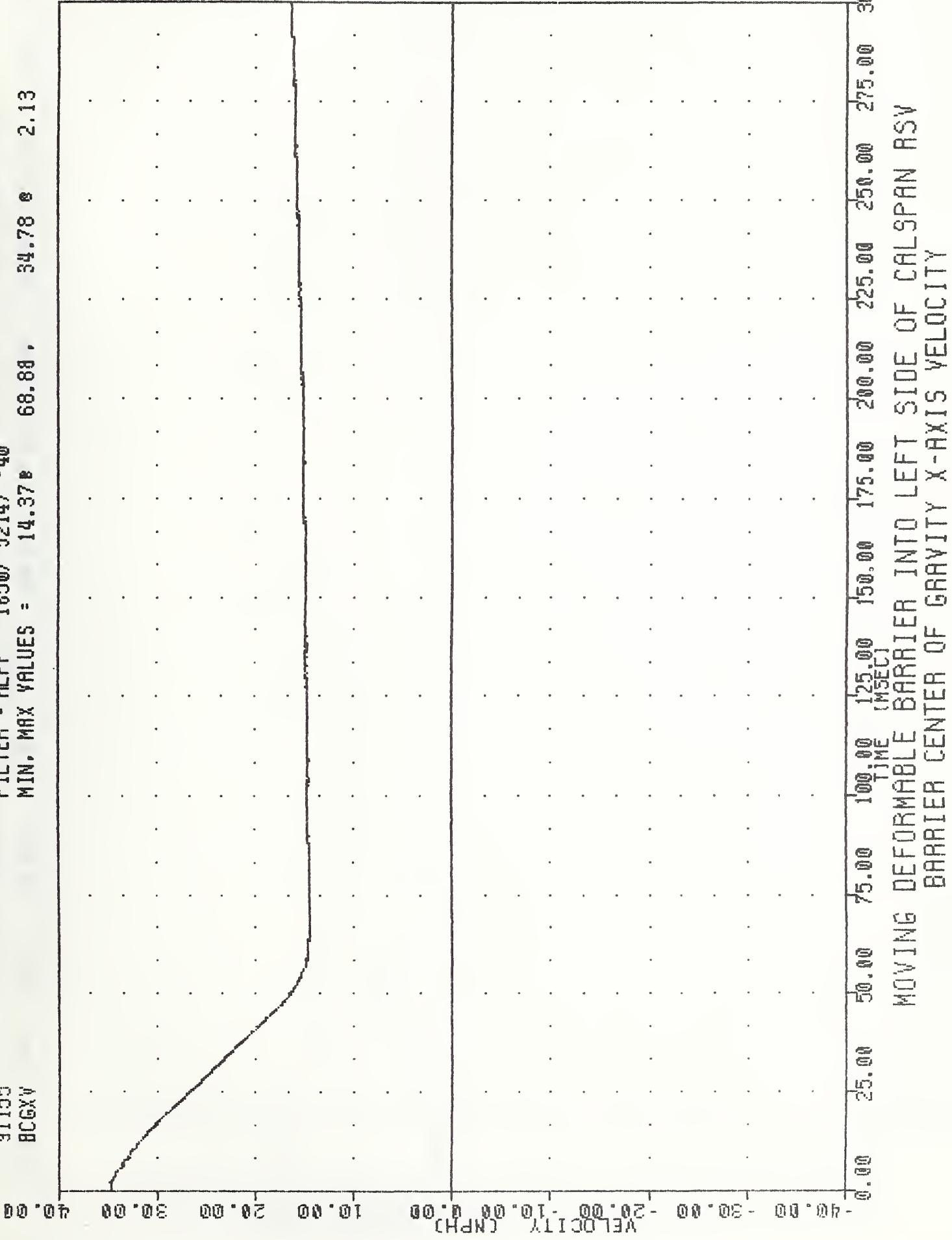
FILTER = BLPF 100/ 316/-40
MIN, MAX VALUES = -20.408 44.88 , 1.07 e 173.38



MOVING DEFORMABLE BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

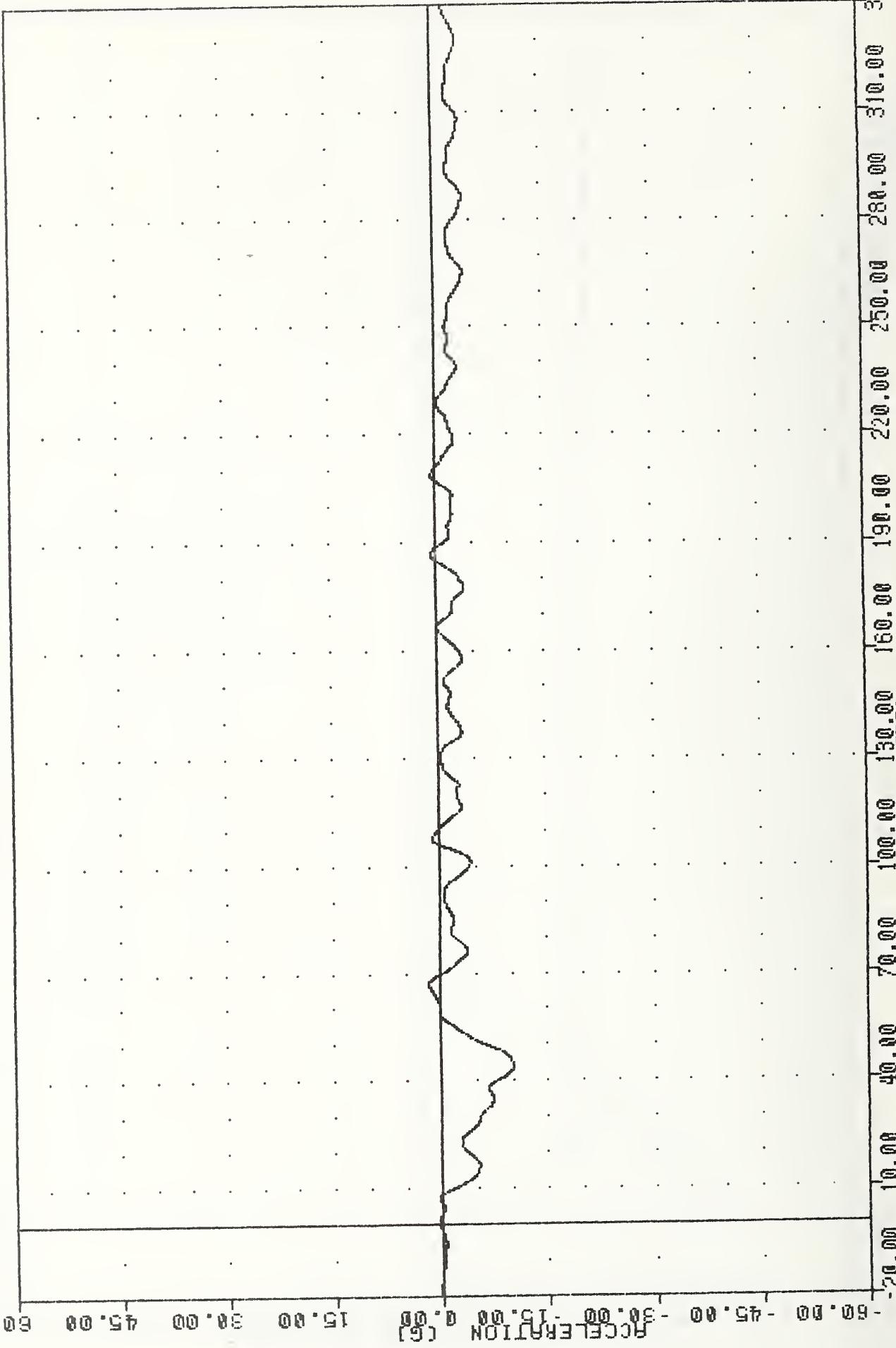
WTC 91155
LEFT SIDE IMPACT

FILTER = ALPF 1650/ 5214/-40
MIN, MAX VALUES = 14.37e 68.89 , 34.78 e 2.13



VRTC 910604
LEFT SIDE IMPACT
91155
BCGY6

FILTER = BLPP 100/ 316/ -40
MIN. MAX VALUES = -10.148 44.00 . 1.60 e 66.75

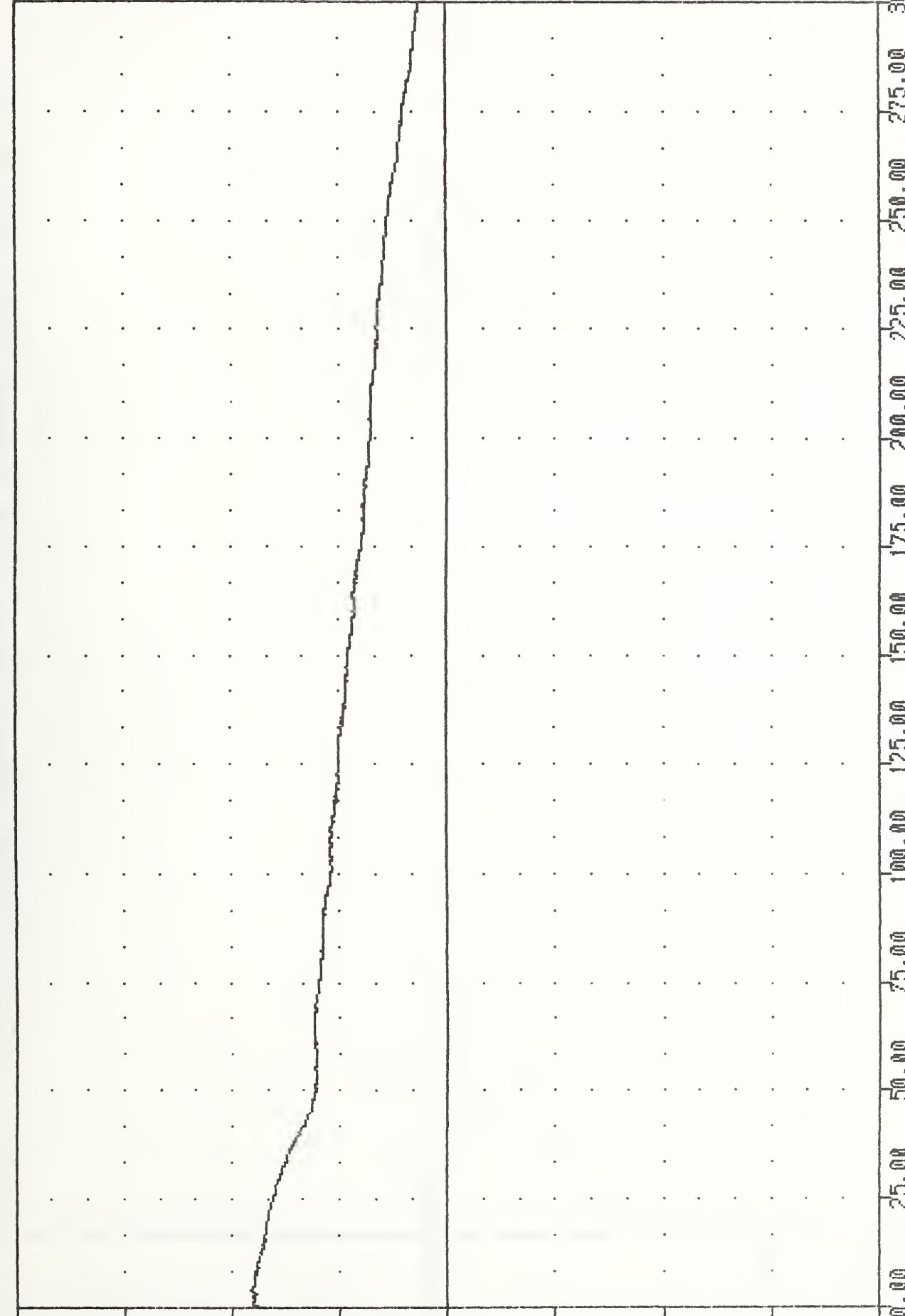


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
BARRIER CENTER OF GRAVITY Y-AXIS ACCELERATION
910604

VRIC 9110004
LEFT SIDE IMPACT
31155

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 2.528 300.00 , 18.20 e 3.88

-40.00 -30.00 -20.00 -10.00 10.00 20.00 30.00 40.00
VELOCITY (MPH)



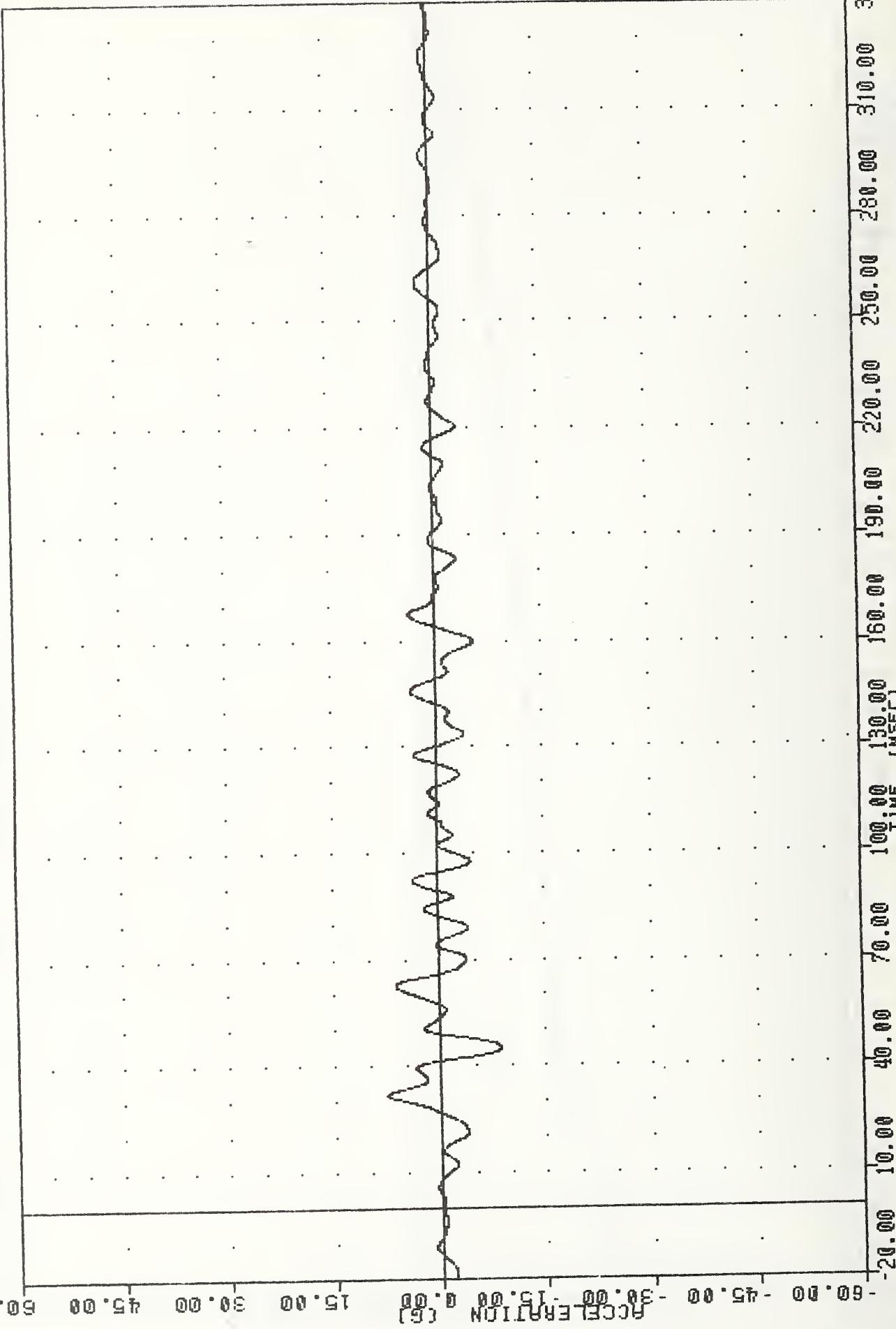
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
BARRIER CENTER OF GRAVITY Y-AXIS VELOCITY

WATC

LEFT SIDE IMPACT

91155
8CGZG

FILTER = BLRF 100/ 316/-40
MIN, MAX VALUES = -8.498 44.88 , 7.57 e 31.75

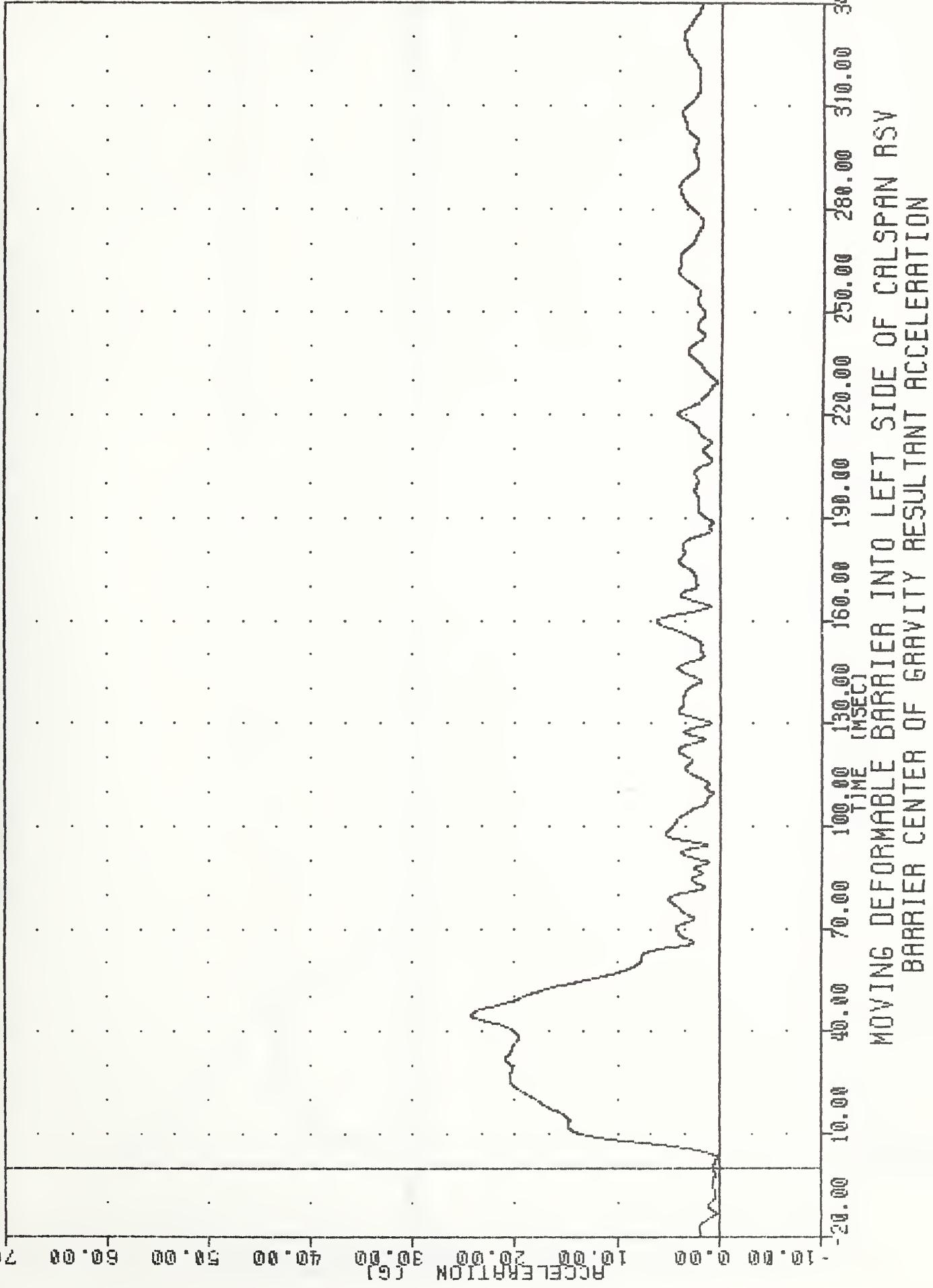


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
BARRIER CENTER OF GRAVITY Z-AXIS ACCELERATION

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF CALSPAN RSV
BARRIER CENTER OF GRAVITY Z-AXIS ACCELERATION

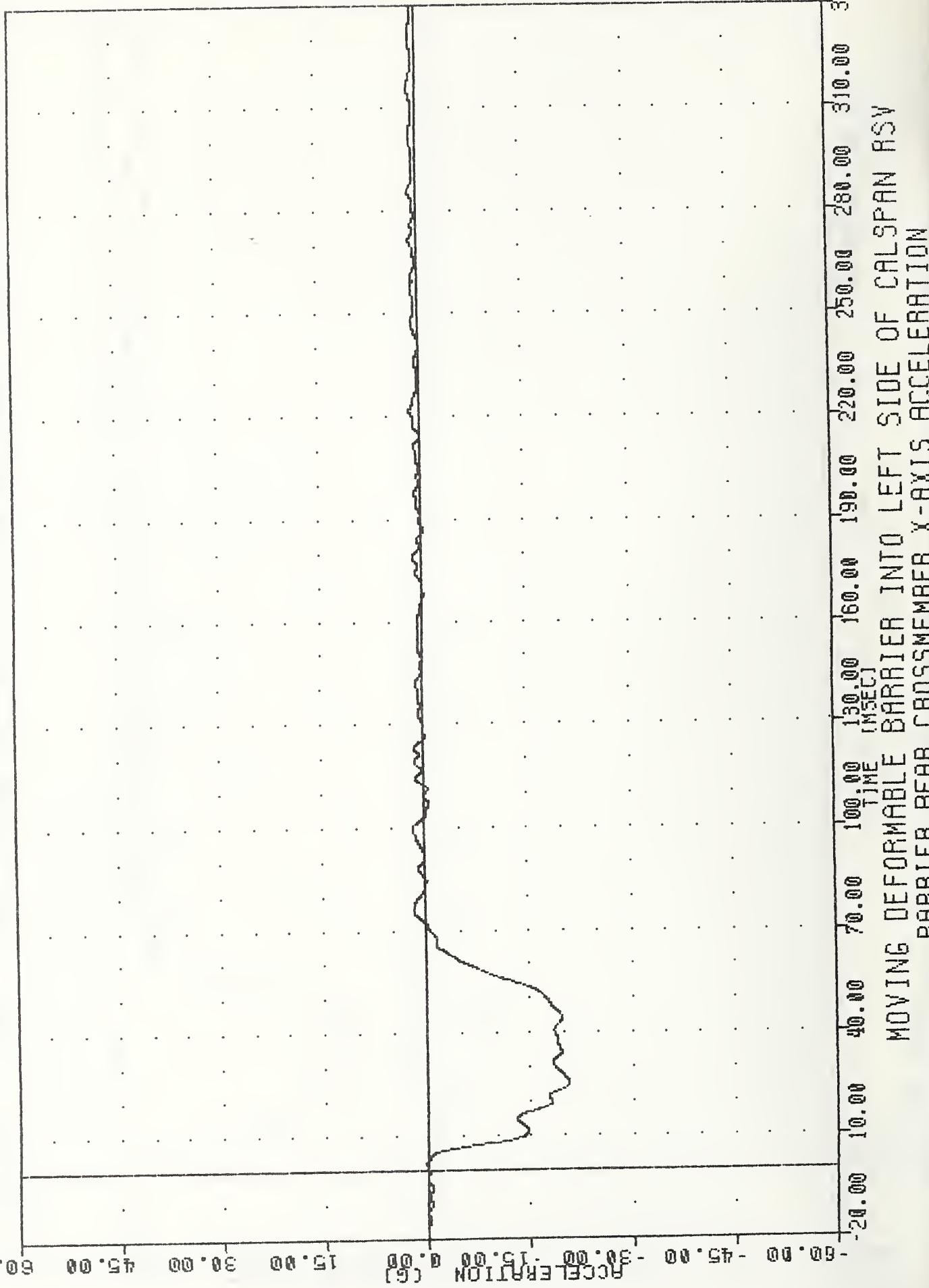
YRTC 910604
LEFT SIDE IMPACT
91155
BCGR6

FILTER = BLPF 100/ 316/-40
MIN. MAX VALUES = 0.208 3.00 24.28 @ 44.75



VRIC , 910604
LEFT SIDE IMPACT
91155
BRCG

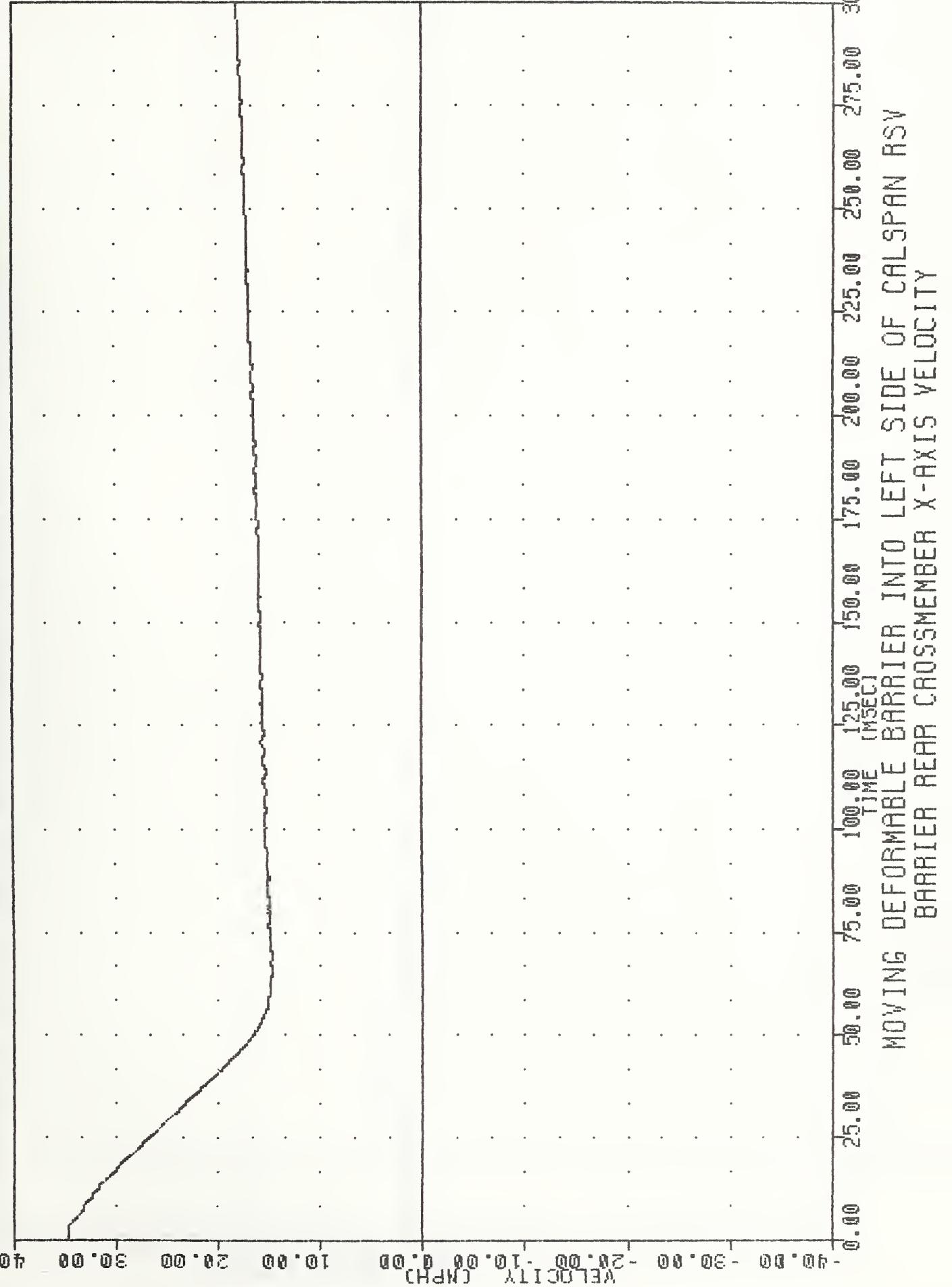
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -20.628 25.25 , 1.78 @ 99.63



YPTC
910604

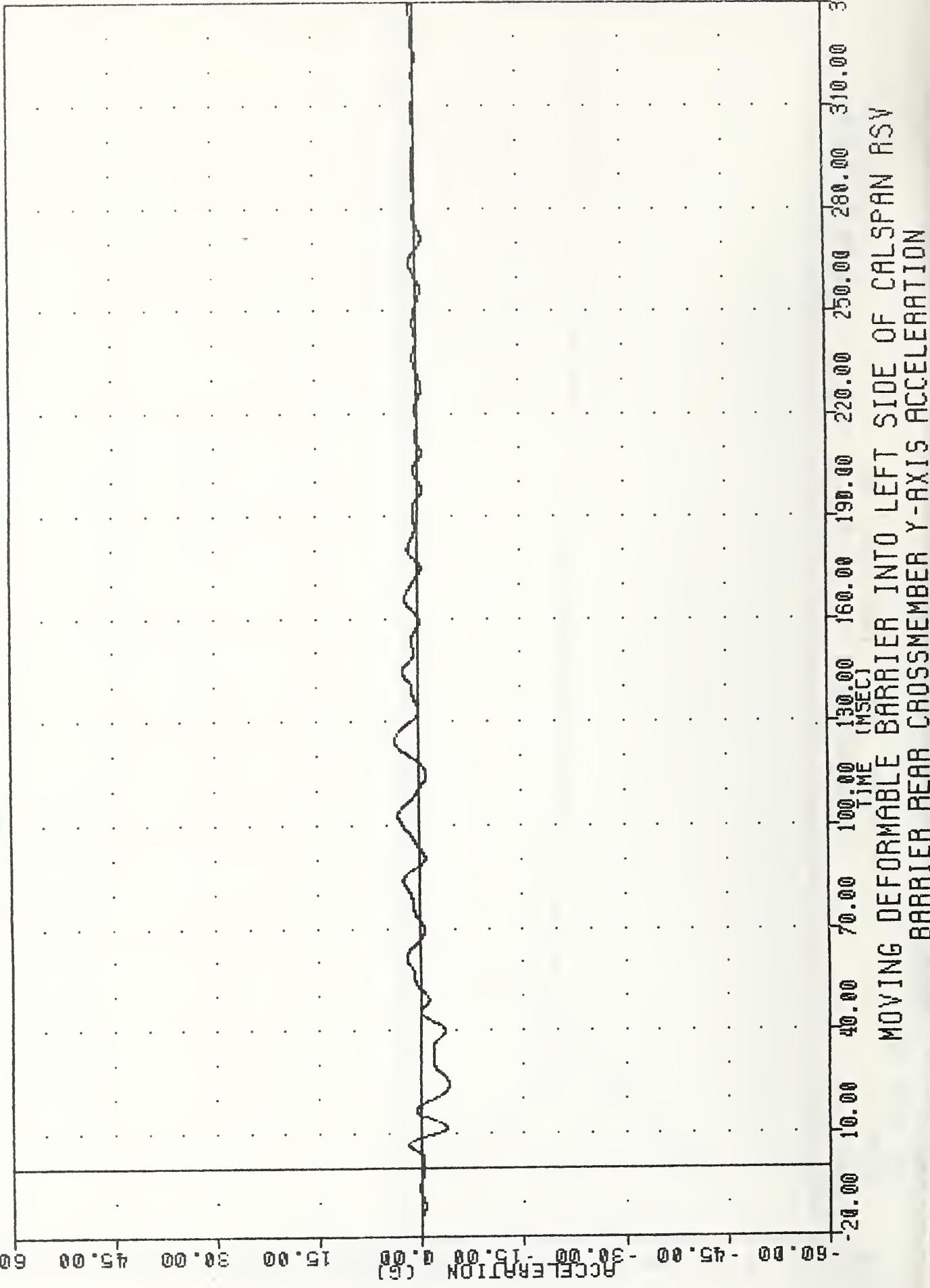
91155
LEFT SIDE IMPACT
BRCKX

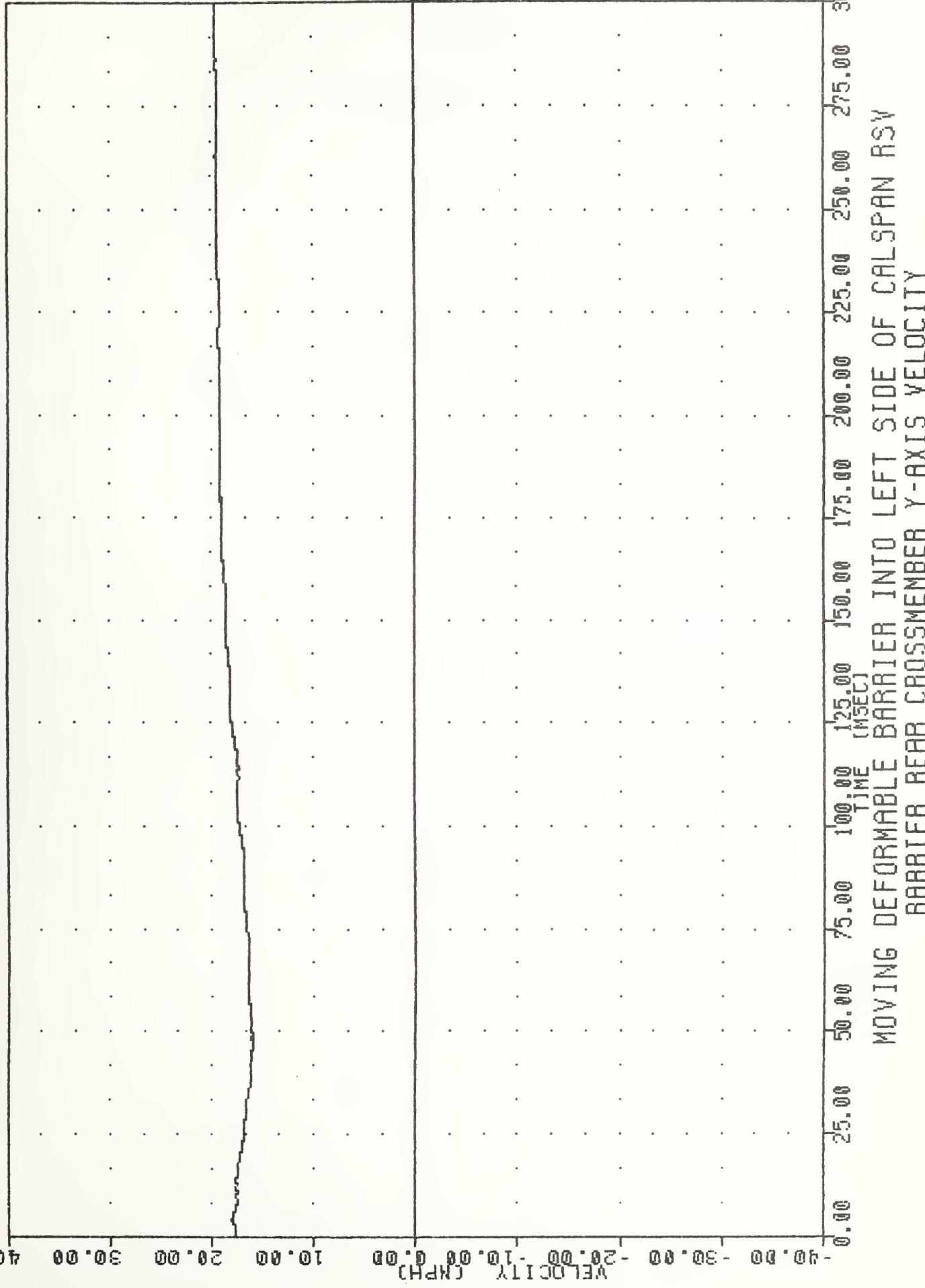
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 14.69e - 69.63 - 34.70 & 0.00

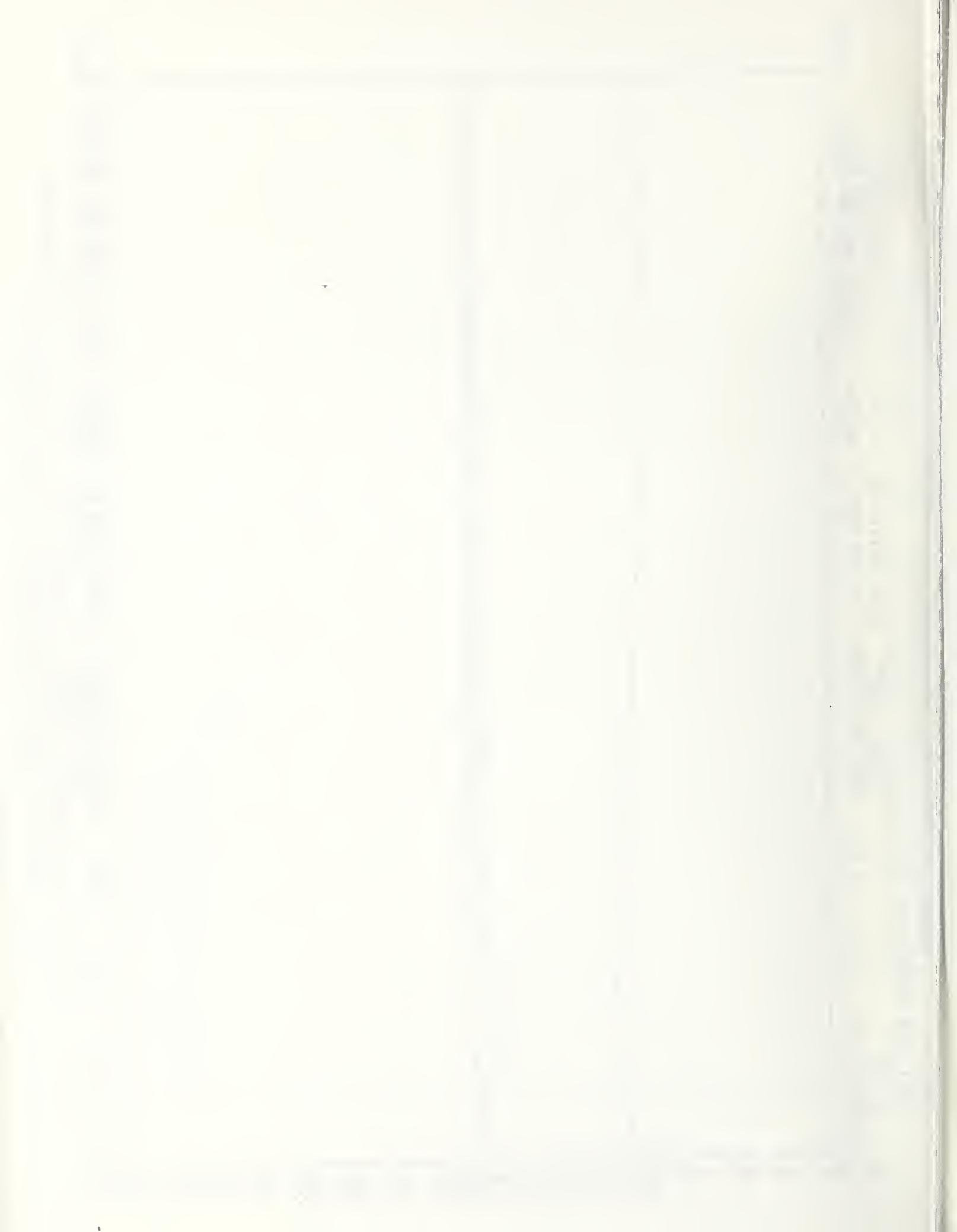


VRTC , 910604
LEFT SIDE IMPACT
91155
BRGY6

FILTER = BLPF 100/ 316/-40
MIN, MAX VALUES = -4.028 24.13 , 3.59 8 124.25

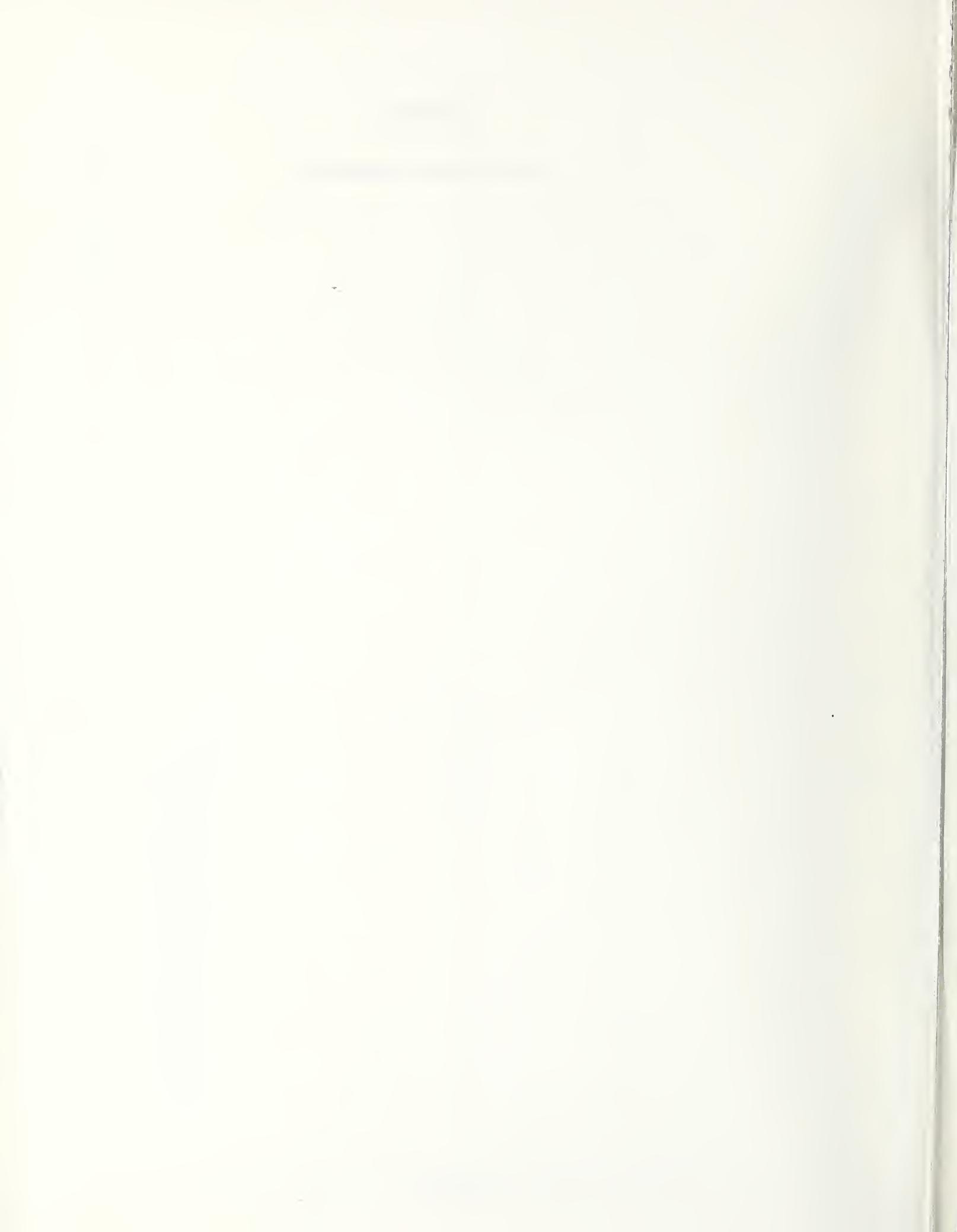


WRTC 910604
LEFT SIDE IMPACT91155
BRGVFILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 15.99@ 46.25@ 19.58@ 299.63



APPENDIX C

MISCELLANEOUS INFORMATION



DUMMY INSTRUMENTATION PLACEMENT
 DUMMY MANUFACTURER & S/N: HUMANETICS 002
 SEATING POSITION: DRIVER

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
HEDXG1	HEAD	X	ENDEVCO	7264	FC01J	FRONT
HEDYG1	HEAD	Y	ENDEVCO	7264	FG28J	LEFT
HEDZG1	HEAD	Z	ENDEVCO	7264	DF48J	UP
SHLYG1	LEFT SHOULDER	Y	ENDEVCO	7264	FG31J	UP
SHLYD1	LEFT SHOULDER					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	62	
T01XG1	UPPER SPINE	X	ENDEVCO	7264	DC54J	REAR
T01YG1	UPPER SPINE	Y	ENDEVCO	7264	DC18J	LEFT
T01YGA	UPPER SPINE	Y	ENDEVCO	7264	FJ92J	RIGHT
T01ZG1	UPPER SPINE	Z	ENDEVCO	7264	FC43J	UP
T12XG1	LOWER SPINE	X	ENDEVCO	7264	FH37J	FRONT
T12YG1	LOWER SPINE	Y	ENDEVCO	7264	FF73J	LEFT
T12YGA	LOWER SPINE	Y	ENDEVCO	7264	FG43J	LEFT
T12ZG1	LOWER SPINE	Z	ENDEVCO	7264	DC20J	UP
LURYG1	LEFT UPPER RIB	Y	ENDEVCO	7264	DC68J	RIGHT
LURYGA	LEFT UPPER RIB	Y	ENDEVCO	7264	DE99J	RIGHT
LURYD1	LEFT UPPER RIB					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	28	
LCRYG1	LEFT CENTER RIB	Y	ENDEVCO	7264	FF79J	RIGHT
LCRYGA	LEFT CENTER RIB	Y	ENDEVCO	7264	FC60J	RIGHT
LCRYD1	LEFT CENTER RIB					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	45	
LLRYG1	LEFT LOWER RIB	Y	ENDEVCO	7264	FG33J	RIGHT
LLRYGA	LEFT LOWER RIB	Y	ENDEVCO	7264	DC72J	RIGHT
LLRYD1	LEFT LOWER RIB					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	54	
LUAYG1	LEFT UPPER					
	ABDOMEN	Y	ENDEVCO	7264	ET91J	RIGHT
LUAYD1	LEFT UPPER ABDOMEN					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	60	

DUMMY INSTRUMENTATION PLACEMENT CONTINUED

DUMMY MANUFACTURER & S/N: HUMANETICS 002

SEATING POSITION: DRIVER

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
LLAYG1	LEFT LOWER ABDOMEN	Y	ENDEVCO	7264	FB67J	RIGHT
LLAYD1	LEFT LOWER ABDOMEN DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	109	
PEVXG1	PELVIS	X	ENDEVCO	7264	EW44J	FRONT
PEVYG1	PELVIS	Y	ENDEVCO	7264	FJ66J	RIGHT
PEVZG1	PELVIS	Z	ENDEVCO	7264	FG97J	UP

DUMMY INSTRUMENTATION PLACEMENT
 DUMMY MANUFACTURER & S/N: VRTC 905
 SEATING POSITION: LEFT REAR PASSENGER

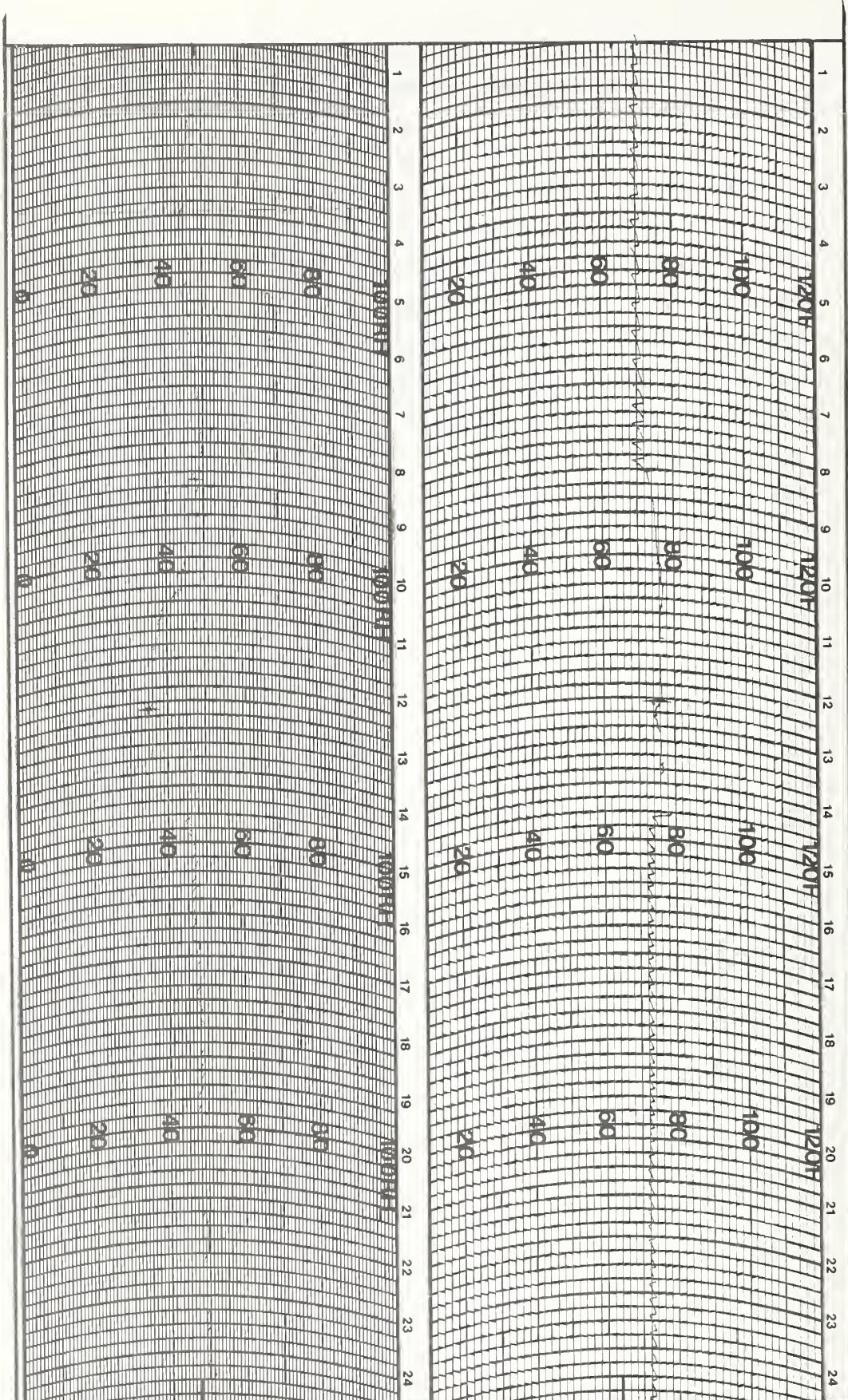
MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
HEDXG4	HEAD	X	ENDEVCO	7264	BP55J	REAR
HEDYG4	HEAD	Y	ENDEVCO	7264	BE62J	LEFT
HEDZG4	HEAD	Z	ENDEVCO	7264	BD91J	UP
T01XG4	UPPER SPINE	X	ENDEVCO	7264	BO98J	REAR
T01YG4	UPPER SPINE	Y	ENDEVCO	7264	DG87J	LEFT
T01ZG4	UPPER SPINE	Z	ENDEVCO	7264	EK16J	UP
T12XG4	LOWER SPINE	X	ENDEVCO	7264	EC41J	FRONT
T12YG4	LOWER SPINE	Y	ENDEVCO	7264	EH88J	LEFT
T12YGD	LOWER SPINE	Y	ENDEVCO	7264	EJ59J	LEFT
T12ZG4	LOWER SPINE	Z	ENDEVCO	7264	DE15J	UP
LURYG4	LEFT UPPER RIB Y		ENDEVCO	7264	EJ62J	RIGHT
LURYGD	LEFT UPPER RIB Y		ENDEVCO	7264	CA49H	RIGHT
LLRYG4	LEFT LOWER RIB Y		ENDEVCO	7264	EJ97J	RIGHT
LLRYGD	LEFT LOWER RIB Y		ENDEVCO	7264	BE69J	RIGHT
CSTYD4	CHEST					
	DISPLACEMENT	Y	BOURNS	5185	0483-280	
PEVXG4	PELVIS	X	ENDEVCO	7264	BH95J	REAR
PEVYG4	PELVIS	Y	ENDEVCO	7264	BD53J	LEFT
PEVZG4	PELVIS	Z	ENDEVCO	7264	BF11J	UP

VEHICLE INSTRUMENTATION PLACEMENT

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
RFSXG	RIGHT FRONT SILL	X	ENDEVCO	2264	AR38	FRONT
RFSYG	RIGHT FRONT SILL	Y	ENDEVCO	2264	AN45	LEFT
RFSZG	RIGHT FRONT SILL	Z	ENDEVCO	2264	AK21	UP
RRSXG	RIGHT REAR SILL	X	ENDEVCO	2264	BB60	REAR
RRSYG	RIGHT REAR SILL	Y	ENDEVCO	2264	AS06	LEFT
RRSZG	RIGHT REAR SILL	Z	ENDEVCO	2264	AS76	DOWN
RDKXG	REAR DECK	X	ENDEVCO	2264	AV27	REAR
RDKYG	REAR DECK	Y	ENDEVCO	2264	BA68	LEFT
RDKZG	REAR DECK	Z	ENDEVCO	2264	AZ88	UP

VEHICLE INSTRUMENTATION PLACEMENT

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
BCGXG	CENTER OF GRAVITY	X	ENDEVCO	2264	AS03	FRONT
BCGYG	CENTER OF GRAVITY	Y	ENDEVCO	2264	AS71	LEFT
BCGZG	CENTER OF GRAVITY	Z	ENDEVCO	2264	AR49	UP
BRCXG	REAR CROSSMEMBER	X	ENDEVCO	2264	AY13	REAR
BRCYG	REAR CROSSMEMBER	Y	ENDEVCO	2264	AS95	RIGHT



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